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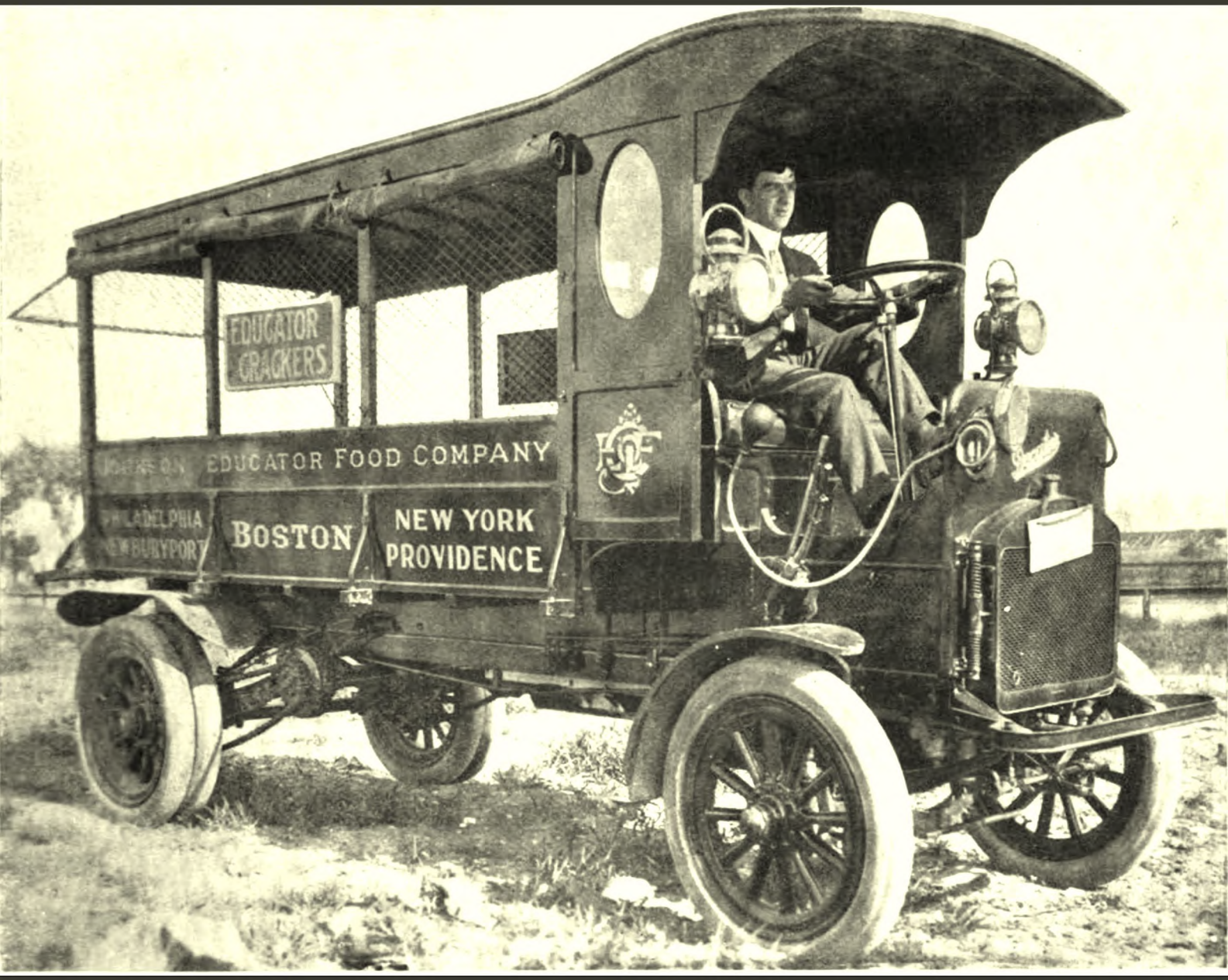

Power wagon

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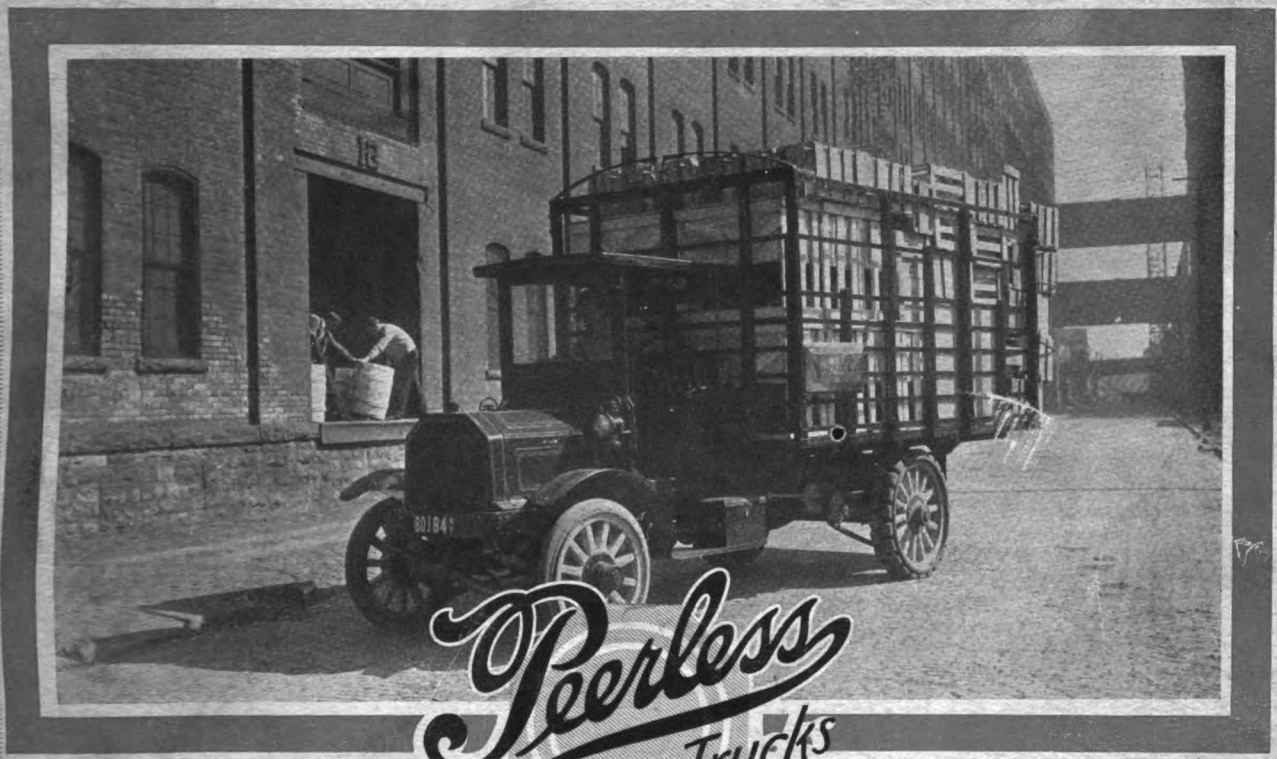
No. 86. Chicago, January, 1912. Price 20 Ce

THE POWER WAGON



Peerless 3-Ton Truck. Built also in 4-Ton and 5-Ton capacities.

Peerless Motor Trucks

We invite correspondence concerning your trucking problems.

DESIGNED with thorough knowledge of trucking requirements, and built from the ground up for trucking efficiency, the Peerless Motor Truck has proven the fitness of its name.

Peerless quality is backed by the determination to sell no truck until the user's profit can be proved—beyond the possibility of a reasonable doubt.

TRUCK DEPARTMENT

THE PEERLESS MOTOR CAR CO.

CLEVELAND

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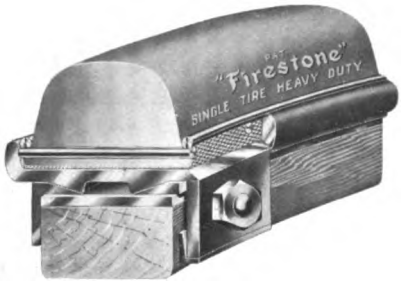
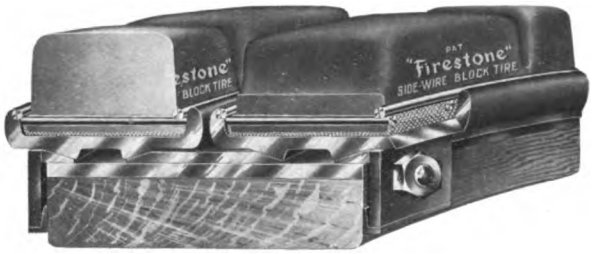
"Firestone"

Motor Truck Tires and
QUICK REMOVABLE RIMS

Avoid Lay-Ups for Tire Repairs





Single or dual. Old and S. A. E. standards. Regular type for ordinary service. Block type for increased traction and non-skid effect in heavy service.

Your tire can be removed and a new tire on spare rim substituted, wherever your truck may happen to be. And your truck keeps on *delivering.* It keeps on *earning* instead of *costing* you money.

You get more mileage per tire, because you can have an injured tire taken off promptly and repaired before it is too far gone. This is an exclusive feature of the side wire tire.

Let us send you full information.

The Firestone Tire & Rubber Co., Akron, Ohio

"America's Largest Exclusive Tire and Rim Makers"

Firestone Truck Tires are sold and applied in 100 principal vehicle using centers. Double the service organization back of any other tire.

Please mention the "Power Wagon" when writing to advertisers.

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Natco MOTOR TRUCKS

Facilities Unsurpassed
for the
Manufacture of
Motor Trucks

See Exhibit
Space D, Armory
Chicago, February 5-10

National Motor Truck Co.

Under same management as National Cycle & Mfg. Co.

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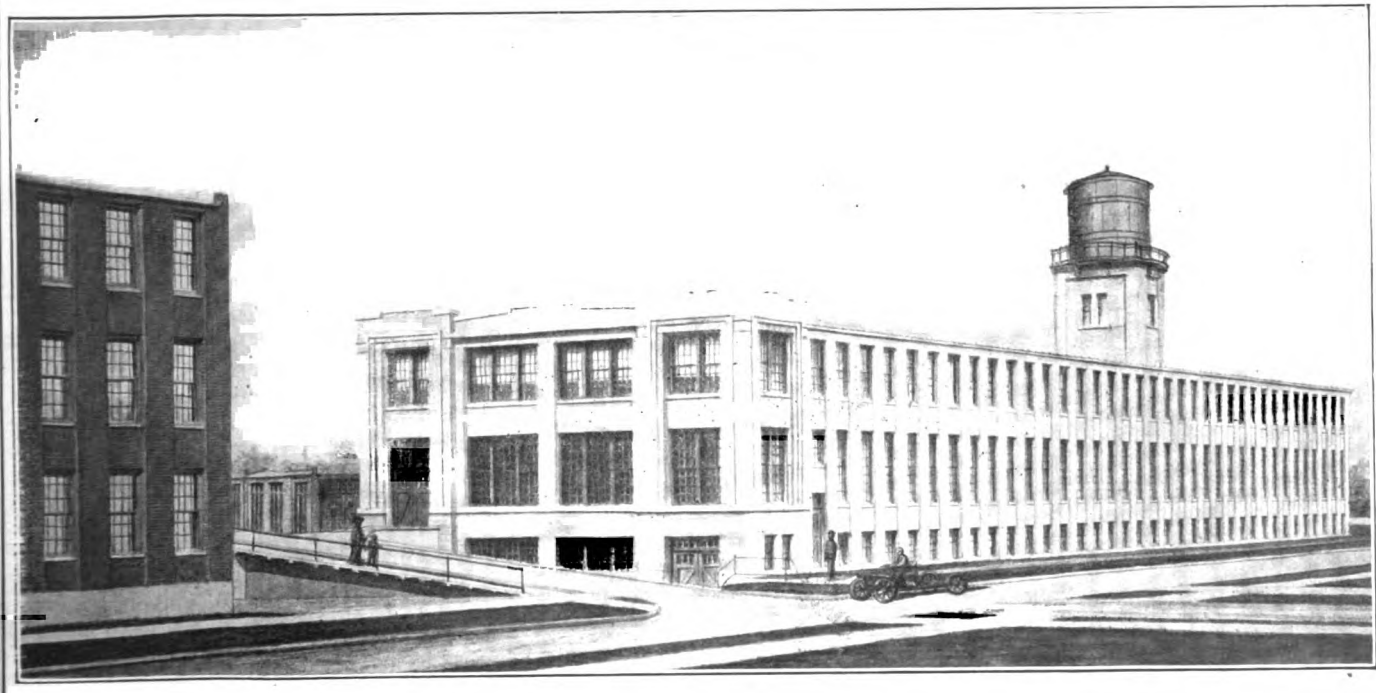

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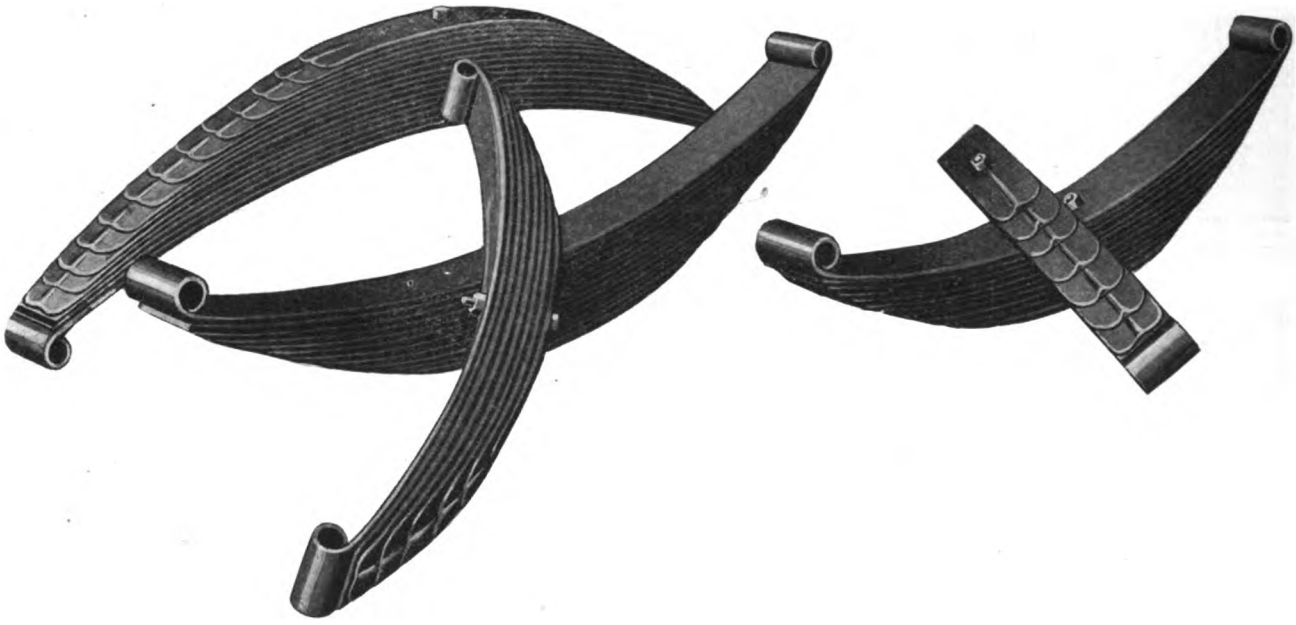
Reliable Springs

Are More Important on Motor Trucks Than on Pleasure Cars



¶ The use of our springs is an insurance policy against interruptions in service. Our thin leaf construction insures absence of destructive vibration WHEN THE TRUCK IS LIGHT and against breakage when the truck is OVERLOADED.

¶ A list of leading manufacturers using our springs furnished on request.

The PERFECTION SPRING COMPANY

Cleveland, Ohio

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PIERCE-ARROW

MOTOR TRUCKS

The saving effected by motor truck service, as compared to your present horse-drawn service, is *profit*.

The conserving of energy in transmission of power by worm gear drive, as compared to chain drive, is *additional* profit.

Worm gear drive is a principal feature of PIERCE-ARROW Motor Trucks.

Capacity, 5 Tons

THE PIERCE-ARROW MOTOR CAR COMPANY
BUFFALO, N. Y.

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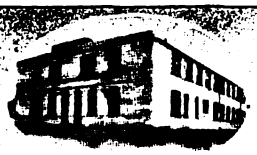


FROM THIS
Small Factory in 1907
Containing 17000 Square Feet of Floor Space

Continental Growth Shows Continental Popularity

THESE FIGURES ARE THE PROOF

Year 1907-Number of Motors built-1000
" 1908 " " " " 2010
" 1909 " " " " 9480
" 1910 " " " " 15000
" 1911 " " " " 18000
" 1912-FACTORY CAPACITY-35000

TO THIS
Immense Modern Fire Proof Detroit Plant in 1912—Containing over 225000 Square Feet of Floor Space and covering 12 acres.

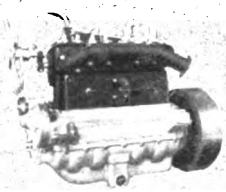
The Present Continental Plant at Muskegon, Mich. devoted Exclusively to the Manufacture of Continental Motors.

See the New Six Cylinder at Chicago Show

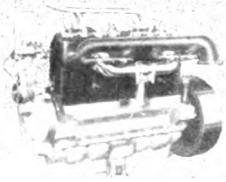
The Six Cylinder Sizes are—3¾x5¼—4⅛x5¼ and 4½x5½—of Latest Design

The reputation this noted motor has made in many of the best known pleasure and commercial vehicles should be carefully considered when selecting a motor for your 1913 product. Long stroke, enclosed valve and tappet mechanism, large valves, perfect oiling system, accessibility of parts, quietness of operation, etc. are prominent features in the new Continental motors. All new models and sizes will be shown at the Chicago show which begins on January 27th, booth number 62 Coliseum Gallery. You are urged to inspect these motors, as early as possible and arrange to place your order and secure definite delivery dates for the season of 1913.

Four 1913 Models

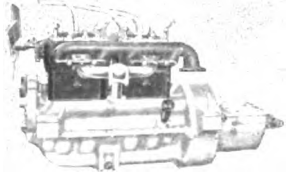


Model "C" 4⅛x5¼ and 3¾x5¼



Model "E" 4⅛x5¼

Model "C" Unit Power Plant



Model "E" Unit Power Plant

FACTORY REPRESENTATIVE
K. FRANKLIN PETERSON
122 S. Michigan Blvd.
Chicago

FACTORY REPRESENTATIVE
L. D. BOLTON
1810 Ford Bldg.
Detroit

Continental Motor Mfg. Co.

General Offices Muskegon, Mich.

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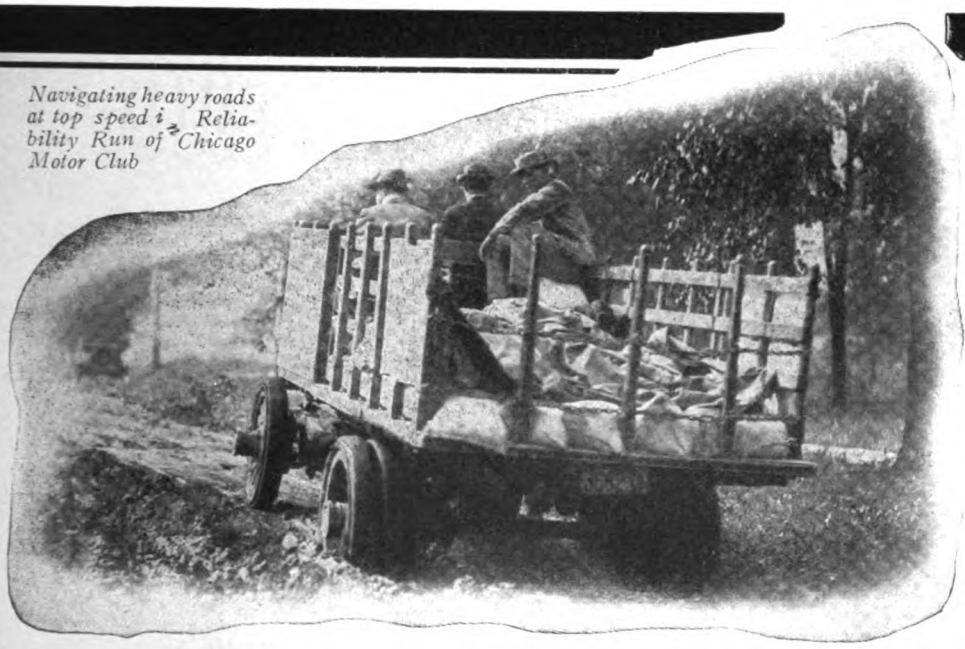


Navigating heavy roads at top speed in Reliability Run of Chicago Motor Club

Dealers—Still a Few Splendid Openings

Not many "Old Reliable" territories remain unclosed—but there are a few. Get your part of our 1912 output **now** for we'll be all closed out later. This truck sells easier than any other. Its advantages are obvious. Our records are perfect. We sell, sell, sell every day. Public opinion in its favor is growing rapidly. The good word is spreading among truck users and users-to-be. Get ready for what will overtake you if you are not prepared. Quick action is necessary. Write us at once.

More Goods Carried Over More Miles at Less Cost Per Ton-Mile

POWERFUL "Old Reliable" 3½-5 Ton Motor Trucks reduce your haulage costs, give you better delivery service with fewer trucks and minimum attention. Figure on using "Old Reliable" Motor Trucks and you can figure right off on **less money for your haulage.** You can chop off the excess right and left and get down to a real economy basis. We have the evidence you want—the records—the big firms who have proved it and who are running more and more of our trucks every day. Best of all, we have the best built motor trucks in the world today.

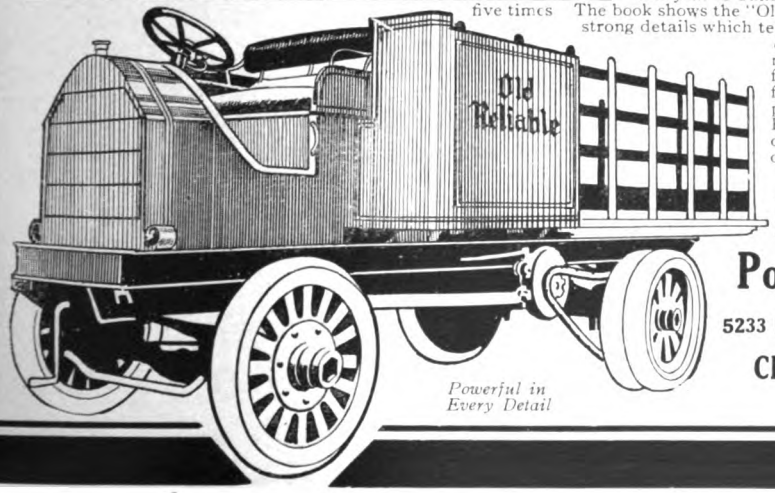
Inch for inch the "Old Reliable" outclasses any other 3½-5 ton motor truck being put out in any other factory today. Point for point it is superior. Because it has been designed and is being constructed under the eye of an engineer who is a master, who has studied every important factory and truck on earth and who today is producing a truck superstrong in the practical features. For example, the parts of an "Old Reliable" which show advanced construction are the ones which do the work, do the brunt of it, take the hard knocks. The "Old Reliable" offers twice the resistance to wear and tear of any other 3½-5 ton motor truck for this reason.

See it at the Show, Chicago Coliseum, Feb. 5-10

Old Reliable 3½-5 Ton Motor Truck

Mark the magnificent features of construction in an "Old Reliable;" double gusset plate construction in the chassis; the splendid Kline brake, a 16x2 with large bearing surface and no gripping; springs so good they are guaranteed for **life** and anchored in such a way they cannot dislodge; a 5-ton truck tire outfit; the motor is of our own construction; cylinders from imported castings; bearings imported direct. ¶ These features emphasize why there is no overload restriction on the "Old Reliable" despite the fact that it is 3½-5 ton truck.

Write for "Old Reliable" Book and Specifications. Let us show you in these why it has been necessary for us this year to build a new factory and increase our output five times. The book shows the "Old Reliable" inside and outside—with strong details which tell the story of economy. The specifications appeal to your best judgment of what constitutes the perfect Commercial Vehicle. Write for these today. Remember we promise you proof that any "Old Reliable" will cost you less to operate per ton-mile than any other motor truck built.



Powerful in Every Detail

Henry Lee Power Co.
5233 Evanston Avenue
CHICAGO

Tear out and mail now.

Henry Lee Power Co.
5233 Evanston Avenue
CHICAGO

Gentlemen:—
Kindly send me at once "The Book of the Old Reliable."

Name.....
Address.....
Business.....

Please mention the "Power Wagon" when writing to advertisers.

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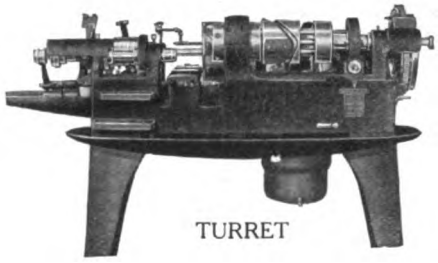
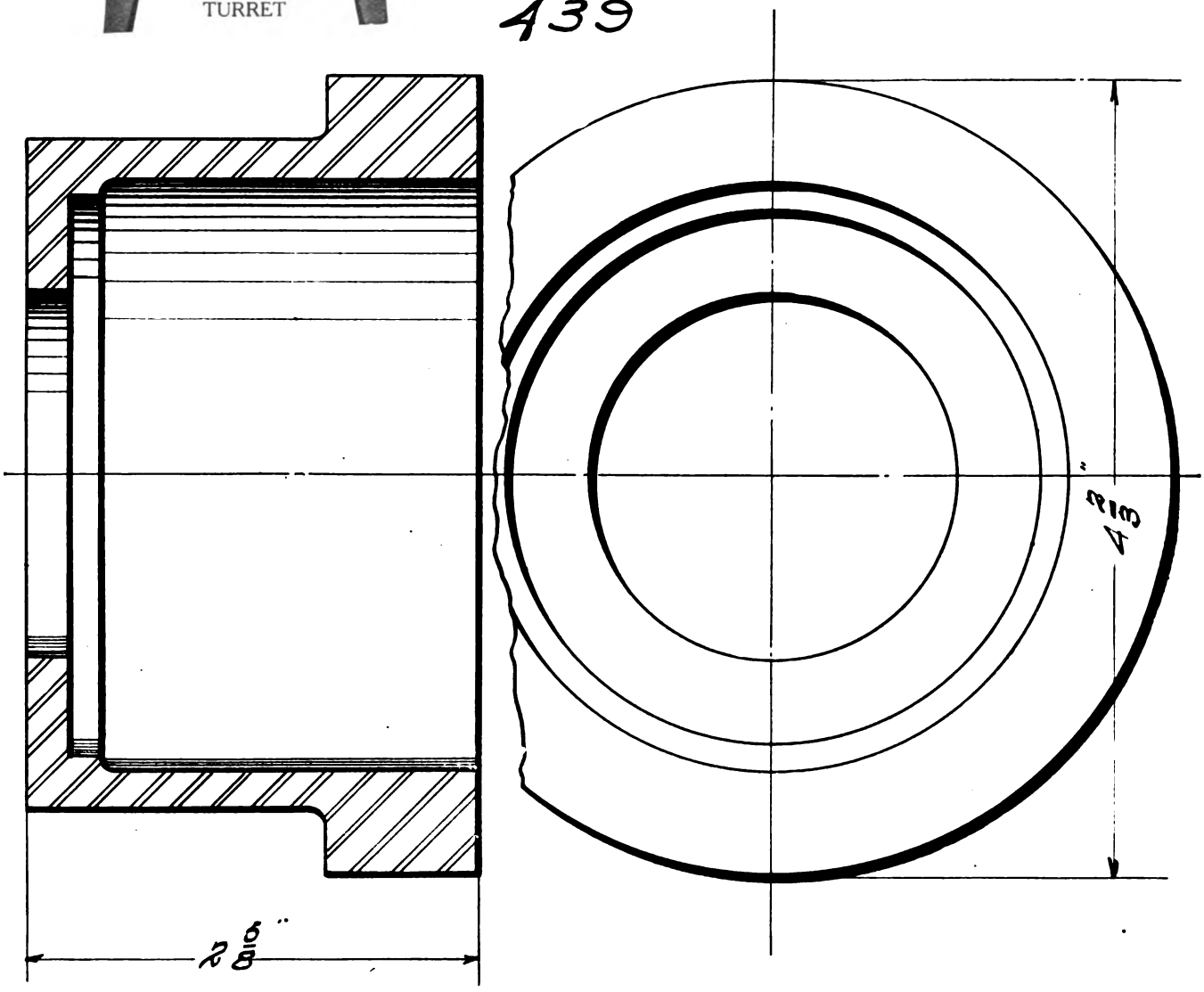
Cleveland Automatics


TURRET

are looked upon as the world's greatest automatic machines. They are the easiest to operate, and embody the fewest number of parts; all of which are simple. Operating expense one mill a minute. Your overhead charges added to that will give you the exact cost per piece. The Pre-eminence of the "Cleveland" is Indisputable. Capacities ¼" to 6¾".

WRITE AT ONCE FOR THE FULL STORY.



PIECE No. 439. Material, Chrome Nickel Steel; made on a 6" Cleveland Automatic Turret Machine; time for all operations, 42 minutes. Send in samples or drawings; we will send you complete specifications explaining outputs, cost of machines and tools, etc., etc. Capacities of our machines ¼" to 6¾".

Cleveland Automatic Machine Company

Eastern Representative
J. B. Anderson, 2450 North 30th Street, Philadelphia, Pa.

Cleveland, Ohio., U. S. A.

Western Representative
Herbert E. Nunn, 562 Washington Boulevard, Chicago, Ill.

Foreign Representatives

Chas. Churchill & Co., London, Manchester, Birmingham, Newcastle-on-Tyne and Glasgow. Messrs. Schuchardt & Schutte, Vienna, Berlin, St. Petersburg and Stockholm, Copenhagen and Budapest. Alfred H. Schutte, Cologne, Brussels, Liege, Paris, Milan and Bilbao.

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Decatur Hoosier Limited—One and One-half Ton Truck

The above truck is in the service of the Johnson Educator Food Company, of Boston, New York and Philadelphia, operating on an average of sixty miles a day and giving perfect satisfaction.

BRIEF SPECIFICATIONS—DECATUR HOOSIER LIMITED

MOTOR—Rutenber 4 cylinder 30 horse power. TRANSMISSION—Selective type three speeds forward and reverse, vanadium heat treated gears IGNITION—Simms high tension fixed. CARBURETOR—Rayfield water jacketed. CLUTCH—Hele-Shaw multiple disc running in oil. JACK SHAFT—Full floating type, gears chrome vanadium steel. SPRINGS—2¼" wide, six leaves of electric silica manganese steel, guaranteed never to take a permanent set or break during the life of the car in the hands of the original purchaser. AXLES—Front, 2¼"x1¾"; rear, 2" dead square nickel steel. STEERING GEAR—Ross, positive back lock. FRAME—4" channel pressed steel trussed with five cross members. WHEEL BASE—129 inches. WHEELS—34", 12 spokes. BRAKES—two set internal. TIRE EQUIPMENT—Michelin demountable pneumatic, 34"x4½", dual in the rear, or any solid, single or dual. BODIES—We make twenty-five standard bodies which we carry in stock. PRICES—Chassis, solid dual tires, $2,400; Pneumatic dual, $2,500

A Partial List of Firms Operating Decatur Hoosier Limited Trucks on an Average of Sixty Miles a Day or Better in All Lines of Business

Best & Co., New York City; The Hartford Lunch Co., New York City; Simpson-Crawford Co., New York City; Lit Bros., Philadelphia, Pa.; Blum Bros.' Philadelphia; American Gas Co., Philadelphia; Henry Seigel Co., Boston; Thos. F. Galvin, Boston; Johnson Educator Food Co., Boston; Fairbanks-Morse Scale Co., Hartford, Conn.; Bay State Box Co., Boston; Tampa Gas Co., Tampa, Fla.; Centlivre Brewing Co., Fort Wayne, Ind.; Jewett City Express, Jewett City, Conn.; The Staples Co., Schenectady, N. Y.; Clark Lumber Co., Auburn, N. Y.; Hood Rubber Co., Boston, Mass.; Merkel Bros., Cincinnati, Ohio; Quinn Supply Co., Chicago; American Dairy Co., Indianapolis, Ind.; Taft & Mitchell, Newton, Mass.; New England Cotton Yarn Co., New Bedford, Mass.; Norristown Gas & Oil Co., Norristown, N. J.; Bamberger & Co., Newark, N. J.

We have some open territory for live agents who are responsible, financially and otherwise, to handle a truck agency on the proper basis. Write for catalog and proposition.

DECATUR MOTOR CAR CO., - DECATUR, INDIANA

Manufacturers

New York Chicago Philadelphia Boston

We Will Exhibit at New York and Boston Shows

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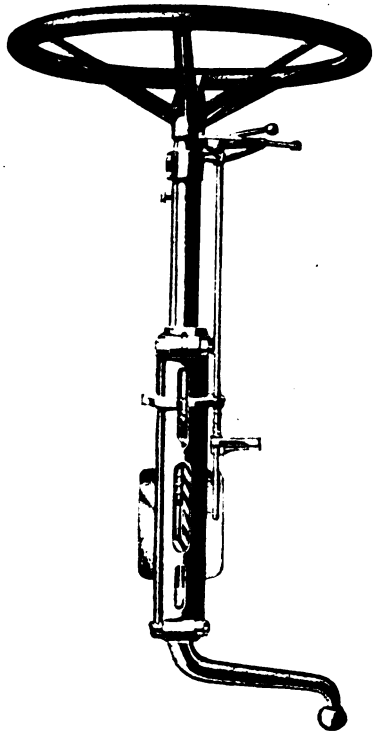

The "ROSS"

The only steering gear for motor trucks and power wagons.

90%

of the steering gears used on American made motor trucks are "Ross" product.

The following concerns use the "Ross"—"there's a reason."

Ahrens-Fox Fire Engine Co., Cincinnati, Ohio.
Alma Manufacturing Co., Alma, Mich.
American-La France Fire Engine Co., Elmira, N. Y.
American Motor Truck Co., Findlay, Ohio.
Argo Electric Vehicle Co., Saginaw, Mich.
Atlas Motor Car Co., Springfield, Mass.
Atterbury Motor Car Co., Buffalo, N. Y.
Avery Co., Peoria, Ill.
B. F. Board Motor Truck Co., Alexandria, Va.
Bowling Green Motor Car Co., Bowling Green, Ohio.
Brodesser Motor Truck Co., Milwaukee, Wis.
Bronx Electric Vehicle Co., New York, N. Y.
Brown-Sautter Motor Truck Co., Newark, N. J.
The Buckeye Mfg. Co., Anderson, Ind.
Cartercar Co., Pontiac, Mich.
Cass Motor Truck Co., Port Huron, Mich.
Champion Wagon Co., Owego, N. Y.
Clark Delivery Car Co., Grand Crossing, Ill.
Clark Power Wagon Co., Lansing, Mich.
Dain Mfg. Co., Ottumwa, Iowa.
Dayton Auto Truck Co., Dayton, Ohio.
Decatur Motor Car Co., Decatur, Ind.
Diamond T Motor Car Co., Chicago, Ill.
Duplex-Power Car Co., Charlotte, Mich.
Eclipse Truck Co., Franklin, Pa.
Findlay Motor Co., Findlay, Ohio.
Franklin Boiler Works Co., Troy, N. Y.
The Garford Co., Elyria, Ohio.
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Monitor Automobile Works, Janesville, Wis.
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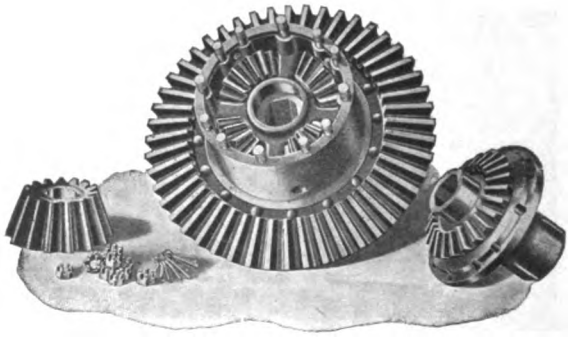
The "Ross" Differential Gear

For Commercial Trucks

We build differentials for 1, 2, 3 and 5 ton trucks—high class in every particular and made of the highest grade material. Superb workmanship—closest inspection possible.



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Ross Gear and Tool Company

749 Main Street - - - Lafayette, Indiana

See Our Exhibits at New York Show, Madison Square Garden, January 15-20, 1912

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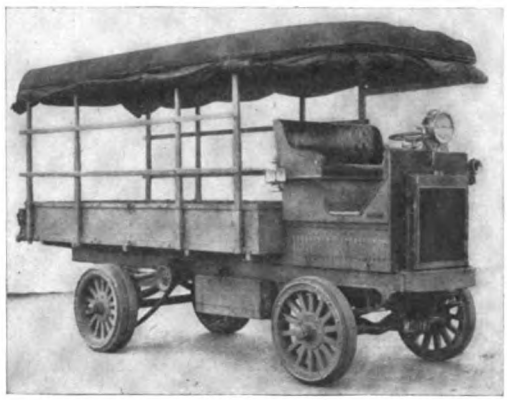
Knickerbocker Trucks

MADE IN NEW YORK CITY

SEE OUR EXHIBIT AT GRAND CENTRAL PALACE



DAY AND NIGHT SERVICE DEPARTMENT

MOTOR

Mounted on hickory subframe 4 cylinder 35-40 H. P. 3½ ton truck 40-45 H. P. for 5 ton truck, 5 bearings in crank shaft, lower half crank case detachable, leaving all bearings intact and accessible for adjustment.

IGNITION

Bosch dual.

CLUTCH

Special cone type with elastic seat, can be removed from truck as a unit in 15 minutes.

TRANSMISSION

Selective type, 3 speeds forward and 1 reverse, gears always in mesh. Speed changes effected by hub clutches. Transmission may be removed as a unit from the truck in 21 minutes.

RADIATOR

Honeycomb type, large and efficient, mounted on springs, may be removed as a unit from the truck in 14 minutes.

THE KNICKERBOCKER has been built on the principle that the first requirement of a truck is to keep running every day in the year. Into each part has been placed reserve strength enough to more than meet any possible requirement that may be placed upon it. In designing the KNICKERBOCKER one essential feature has been constantly in mind—to have every part easily accessible at all times, whether loaded or not.

Our hinged radiator makes every part of the motor and ignition system readily reached from the front and makes the entire removal of the motor, when necessary, a matter of a few moments, and very slight labor.

The springs have been designed to carry the unloaded truck as easily as when loaded. The excess weight being taken up by supplementary springs when a certain point is reached. The engine is not subjected to the roughness of the road at any time.

STEERING GEAR

Heavy worm and sector type, our own design, easy of operation. May be removed from the truck as a unit in 12 minutes.

WHEEL BASE

Optional.

TIRES

3½ ton.
36x5 single front.
36x4 dual rear.
5 ton.
36x6 single front.
36x6 dual rear.

EQUIPMENT

3 combination oil and electric lights, 1-80 hour amp. battery. 1 electric Klaxon horn, 1 jack, 1 complete set of tools.

WEIGHT

3½ ton chassis 5200.
5 ton chassis 6000.

PRICE

Chassis, 3½ ton, $3500.00.
Chassis, 5 ton, $4500.00.
F. O. B. New York, Chassis includes driver's seat.

KNICKERBOCKER MOTOR TRUCK MFG. CO.

Phone 3090 Melrose **151 STREET AND RIVER AVENUE, NEW YORK**

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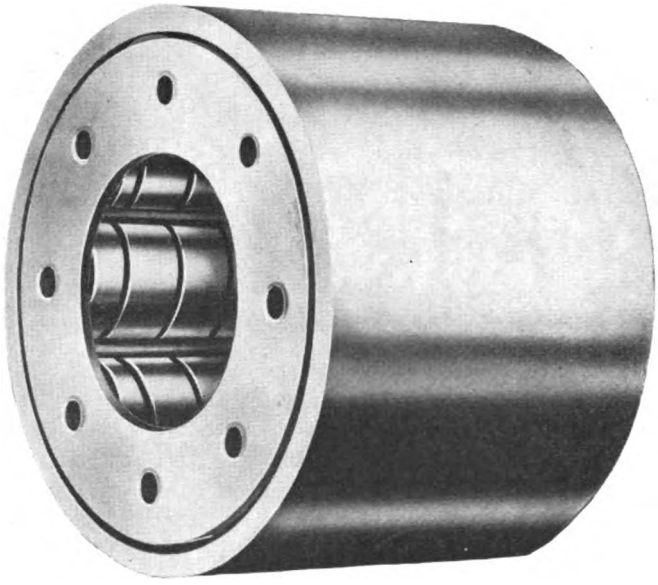

ESTIMATE, if you will, the enormous strain on the driving chains of a commercial truck when the powerful motor with its advantage of gear ratios, is pulling a load of several tons over a bad road---hauling freight under conditions as they exist about depots---and doing it day after day regardless of weather conditions.

It is only then that you can appreciate the tremendous work required of the bearings in the Transmission and Jack Shaft of such vehicles.

Hyatt Roller Bearings are best suited to give long, continued service in these vital parts, because they afford line contact---are flexible, thus relieving the surrounding parts of shocks---and hollow rollers which have a self-cleaning feature that keeps the surface free from dirt and grit.

Hyatt Roller Bearings formed a regular part of the first automobiles built in America. At the present time there are millions in daily operation in every branch of motor car service.

HYATT ROLLER BEARING CO.
DETROIT, MICHIGAN

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Who Sells the Fleets?

The General Vehicle Company has over one thousand (1000) G. V. Electrics divided among one hundred customers. Twenty of these customers operate an average of 29.2 G. V's each.

Over one million dollars' ($1,000,000) worth of G. V. Electrics are used in brewery transportation service alone.

We have been building electric trucks and wagons since 1901 and many of the vehicles referred to above are from six to ten years old.

These facts may upset your preconceived ideas of motor truck adaptability, but a great many intelligent men will learn in the next few years that the electric truck—and particularly the G. V. Electric—is the best truck for 80% of all transfers and deliveries.

The G. V. Electric has the lowest maintenance cost of any power vehicle.

This because it is simple in construction and operation, economical as to power and has great durability.

Furthermore, all six G. V. Models are standardized and all parts of each model are interchangeable and readily accessible.

You will find us at the Madison Square Garden Show, Jan. 15th to 20th, with at least ten vehicles in our exhibit; also at the Chicago Show.

The more horses and wagons you are maintaining for your trucking the more you can save each year by a change to the electric truck. Don't say to yourself, "I can't afford it." Investigate!

Made in the following capacities—750 lbs., 1000 lbs., 2000 lbs., 2 ton, 3½ ton and 5 ton.
Catalogue 72 on request.

GENERAL VEHICLE CO.

Works and General Offices, Long Island City, N. Y.

NEW YORK 505 Fifth Avenue | BOSTON 84 State Street | CHICAGO The Rookery | PHILADELPHIA Witherspoon Building | ST. LOUIS Wainwright Building

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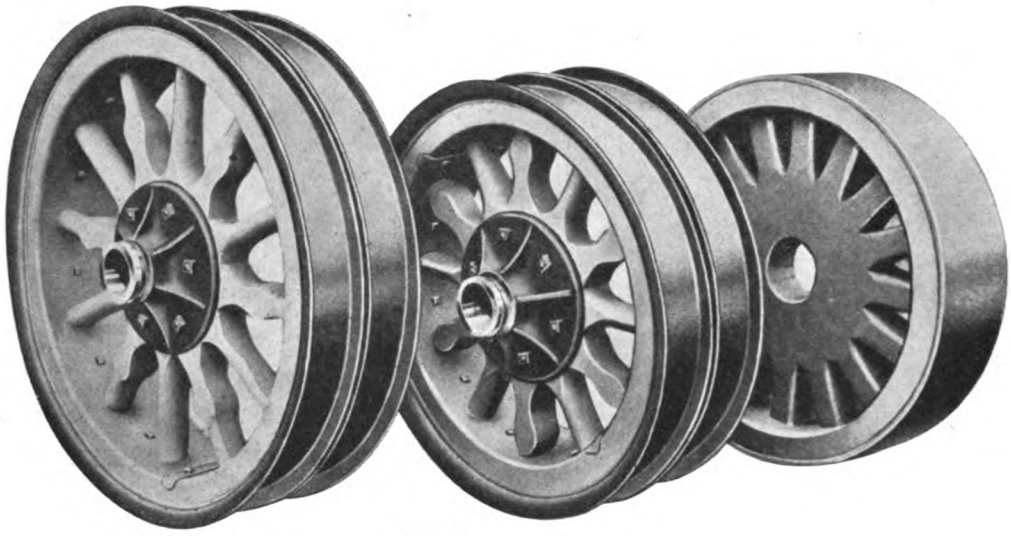

Hayes
"Quality and Service"
WHEELS

To Those Interested in Trucks

IN looking over the different points of the truck you have in mind, start from the ground and work upwards. Then stop and consider how essential to the satisfactory operating and durability of a car, are good reliable wheels. It never occured to you to ask about the wheels before, but just think what a poor wheel would mean in some of the tight places in which your car will find itself.

Our 24 years of experience in the manufacture of wheels enables us to place before the truck builders of today a thoroughly reliable and serviceable wheel.

The timber is selected and contracted before it is cut, felled and cured under our supervision, thus insuring perfect stock of the best grade obtainable. A thoroughly up-to-date factory superintended by milwrights who not only know but who have helped make the wheel business, is at your service day and night. 500 sets of pleasure and truck wheels per day.

In making up your truck specifications insist on

Hayes
"Quality and Service"
WHEELS

Let us help you and do our part in the design of your truck or pleasure car. S. A. E. standard brands on hand at all times.

OUR ENGINEERING FORCE IS AT YOUR DISPOSAL

Hayes Wheel Company, Jackson, Michigan

American Distributing Co., Selling Agents, Jackson, Mich.

Visit our spaces at the Shows — Chicago, Jan. 26th to Feb. 2nd, second floor, space 133, Coliseum Annex; second week, Feb. 3rd to Feb. 10th, space 10, First Regiment Armory.

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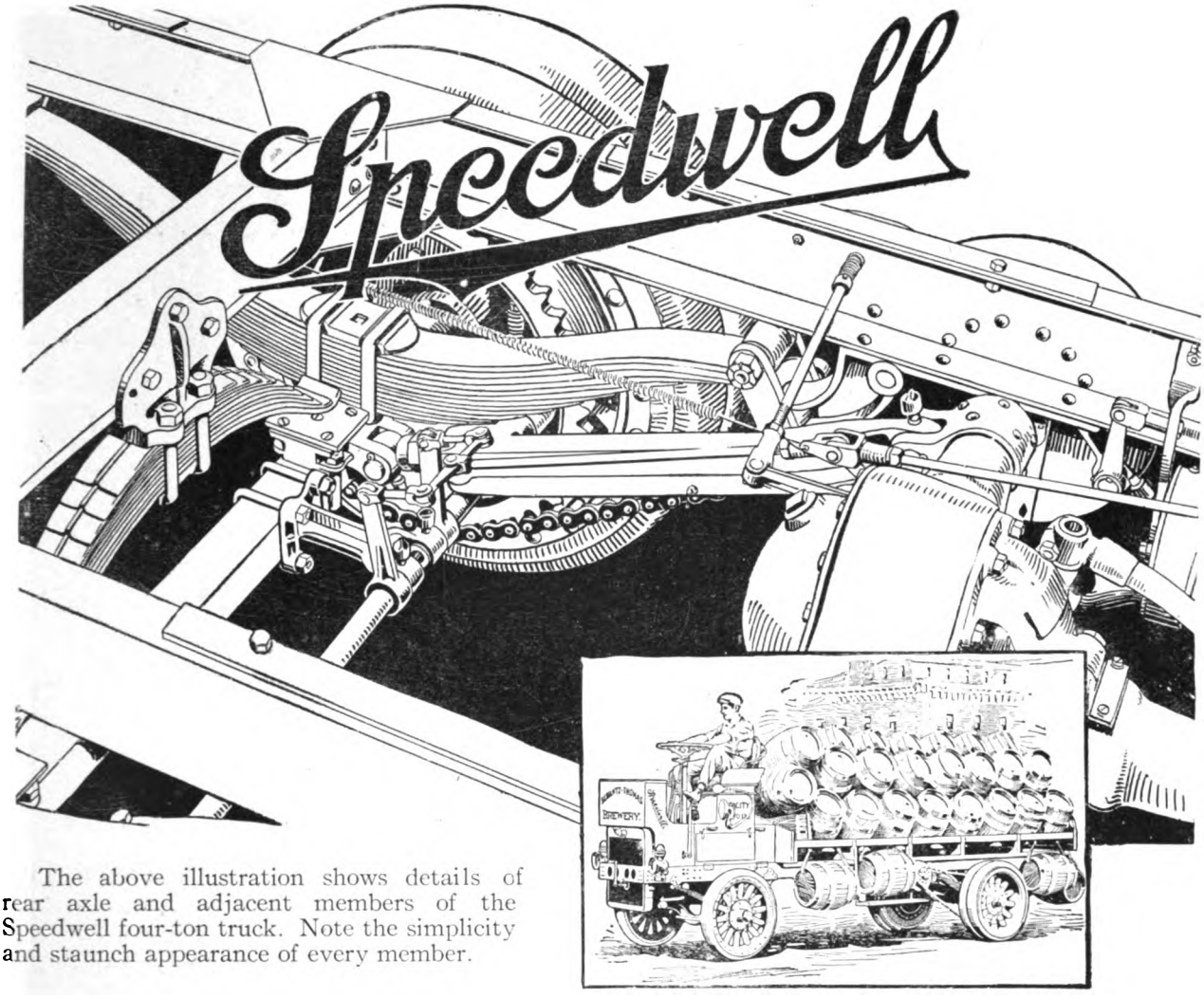

The above illustration shows details of rear axle and adjacent members of the Speedwell four-ton truck. Note the simplicity and staunch appearance of every member.

Go Over Speedwell Trucks Point by Point

You'll not find a single mechanical weakness

The key-note of the standing of the motor truck is, of necessity, efficiency.

The truck must prove its greater economy over other forms of delivery.

With this and this only in view, Speedwell Trucks are built heavier in all important members than other trucks of the same load capacity.

The tires are larger, the frame members and axles stronger, the power greater.

There are scores of features in Speedwell design that are showing their worth in the daily performance of Speedwell Trucks now in service.

On a basis of efficiency the Speedwell Truck demands your attention.

Our latest truck catalog, just off the press, will interest you.

The Speedwell Motor Car Co., 655 Essex Ave., Dayton, Ohio.

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SHELDON

One-Ton Equipment

IT'S READY!

Consists of

Front Axle, I-Beam style, with spring pads forged integral.

Rear Axle, rectangular shape, with integral spring pads, brakes and radius rods.

Jack Shaft with Transmission.

Springs, and all necessary brackets, shackles, clips, etc.

This material is thoroughly tried out, and you can have a complete truck on the market in short order. What we offer you here has been tried and tested, not by the user alone, but by ourselves. Let us send Bulletins on all this material.

We show this material at Madison Square Garden show Jan. 6th to 17th—Space 534.

SHELDON AXLE CO.

WILKES-BARRE, PA.

Chicago Branch:
68 East 12th Street

Detroit Branch:
1215 Woodward Ave.

Please mention the "Power Wagon" when writing to advertisers.

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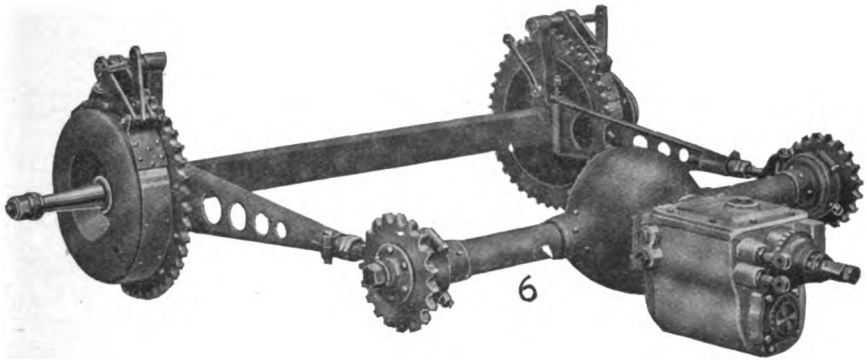
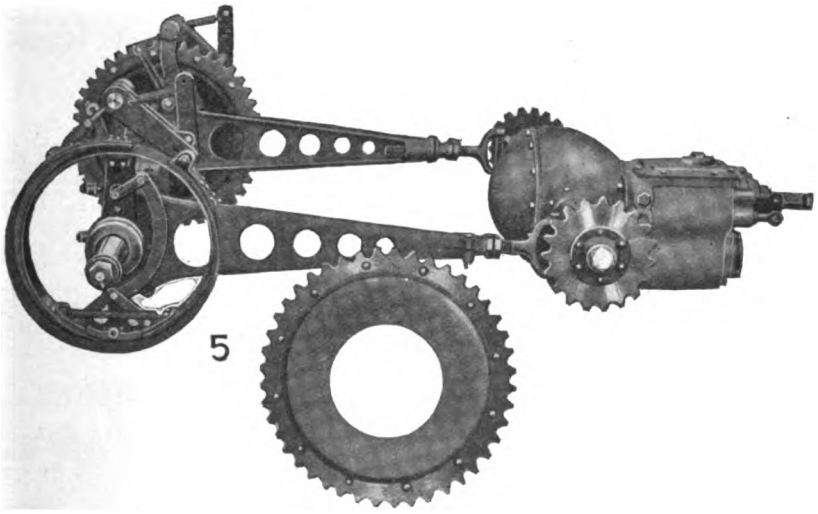
SHELDON

FRONT AXLE No. B-129

One Ton Equipment, D-13



Brakes D-132, Jack Shaft TD-130, Rear Axle B-139.



Same equipment showing brake drum and sprocket removed.
All shown on Bulletins. Mailed free on request.

SHELDON AXLE COMPANY

WILKES-BARRE, PA.

CHICAGO BRANCH: 68 East 12th St. DETROIT BRANCH: 1215 Woodward Ave.

Please mention the "Power Wagon" when writing to advertisers.

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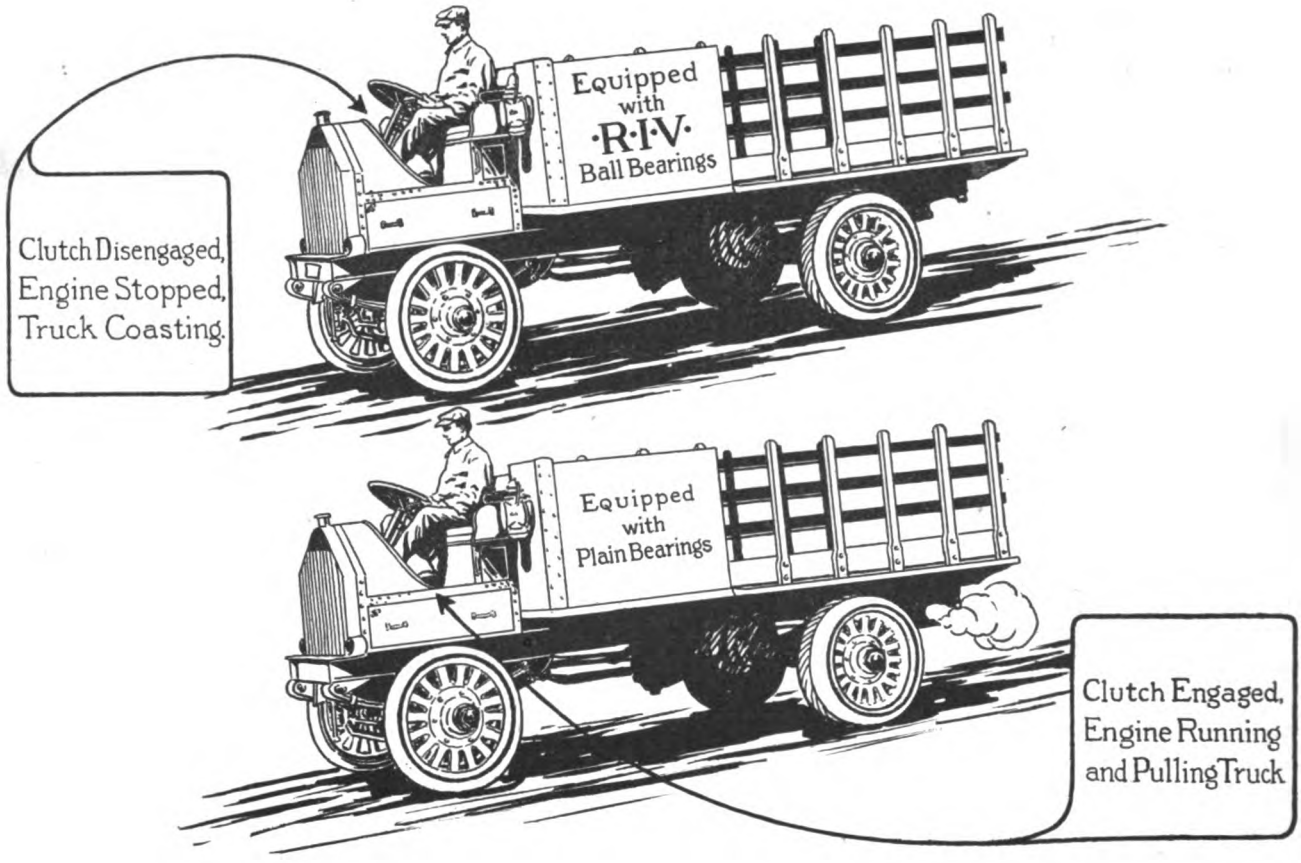
R. I. V.

BALL BEARINGS

Enable You To Coast On a Grade Upon Which You Would Have To Use Power With Plain Bearings


Equipped with ·R·I·V· Ball Bearings
Clutch Disengaged, Engine Stopped, Truck Coasting.
Equipped with Plain Bearings
Clutch Engaged, Engine Running and Pulling Truck

Appreciably Reducing Running Cost In Three Ways:

1—Saving useless consumption of gasoline on moderate grades.
2—Cutting out unnecessary wear-and-tear on motor.
3—Reducing lubrication expense to a minimum.

All of which means that your average per-ton-mile cost of delivery can be considerably lowered—something that your prospective buyer will be interested in.

R. I. V. COMPANY

1771 Broadway New York City

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The Federal sets the final price of standard one-ton trucks—$1,800

Federal One-Ton Truck Chassis, 144 inch wheelbase, including seat, $1,800.
Body type at purchaser's option.

Wheelbase, optional 110 inches or 144 inches. Motor—4 cylinder, 30 horsepower; magneto, high tension; Clutch, 16" cone; Transmission, three speeds forward and reverse; Timken bearings in wheels; Tires, solid 36" x 3½" front; 36" x 4" rear.

FEDERAL ONE TON TRUCK

It is the same Federal Truck that has been in operation and demand for two years; that has stood up and proved up; that has met every hauling test; that has solved every hauling problem.

It is the same Federal that was awarded the Grand Trophy in the Chicago-Detroit-Chicago Truck Run last summer.

It is the same Federal that in the last Glidden tour carried more than a ton of baggage 1,500 miles in eleven days over all sorts of roads and finished with the touring cars. No truck had ever before even completed the Glidden tour on time.

It is the same Federal that has for two years been setting new marks for strength, durability, speed and cost-reduction for the American business man.

Here is YOUR OPPORTUNITY—to buy for $400 to $500 less than the price of any other truck of the same rating, a one-ton truck that is the Standard of Truck-Efficiency, Truck-Reliability and Truck-Economy

HOW CAN THE FEDERAL BE SOLD FOR $1,800 NOW?

Because an enormously increased demand has brought about an enormously increased production.

Because we buy materials now in enormous quantities.

Most important of all, because we have specialized in one product, concentrated all our factory force, energy, experience, engineering skill and capacity in the one-ton Federal Truck. The new price—$1,800—is the Achievement of Specialization.

The 1912 Model of the Federal will be on exhibition at Grand Central Palace, New York, Space No. H-5, second floor, January 10-17; and in the Coliseum, Chicago, Section N, February 5-12.

If you are unable to see the Federal at either of these shows, write us for Federal literature.

FEDERAL MOTOR TRUCK CO., 112 Isabella Street, DETROIT, MICH.

SALES REPRESENTATIVES:

New York City—Motors Engineering & Sales Co., 250 West 54th St.
Boston, Mass.—The Whitten-Gilmore Co., 907 Boylston St.
Philadelphia Pa.—Fischer Motor Car Co., 311 No. 11th St.
Detroit, Mich.—Thompson Auto Sales Company
St. Louis, Mo.—Whitman Motor Car Co., 6900 S. Broadway
San Francisco, Cal.—Standard Motor Car Company
Portland, Oregon—Stoddard-Dayton Auto Company
Los Angeles, Cal.—Standard Motor Car Company
Des Moines, Iowa—Brown, Corley, Ellis Co.
Toledo, Ohio—Atwood Automobile Company
Camden, N. J.—The E. M. F. Company
Lynn, Mass.—C. E. Whitten, 40 Central Ave

CANADIAN REPRESENTATIVES—New Dominion Motors Company, Walkerville, Ont.

Please mention the "Power Wagon" when writing to advertisers.

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OUR TIRE GUARANTEE
On vehicles, for commercial purposes, averaging about 25 miles per day, we guarantee the Gibney Wireless Tire for one year. On vehicles such as public service 'buses, etc., averaging about 100 miles per day, we guarantee the tire for three months.
Jas L Gibney Bro
THIS ROCK-RIBBED-CAST IRON GUARANTEE
IS JUST AS STRONG AS THE TIRE
GIBNEY
Wireless Tires
ONE of the most important factors of the motor vehicle situation of to-day that confronts the business man is the cost of tire upkeep. Pneumatic and Side-Wire Tires have been found to be both expensive and unreliable. Born of necessity, Wireless Tires have solved the problem so efficiently that to-day there is no need to make any comparison.
GIBNEY WIRELESS TIRES are made conscientiously from the first process to the last. Only the finest materials are used. By a special process for attaching these tires to the rim, we make them an inseparable part of the wheel itself. Thus, they can't come off—and they stay on till the rubber wears out. Gibney Wireless Tires are Resilient and Durable—the two most important essentials in considering a tire, and which make for better service and economy.
CUT DOWN YOUR 1911 TIRE EXPENSES
BY USING GIBNEY WIRELESS TIRES!
We have some interesting data based on facts and figures which show just why Gibney Wireless Tires are superior. Yours for the asking—write us to-day.
JAMES L. GIBNEY & BRO.
MANUFACTURERS
PHILADELPHIA, PA.
248-52 West 54th Street, NEW YORK CITY
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BREAD
PURE & CLEAN
R. H. White & Co.
87
FURNITURE DELIVERY

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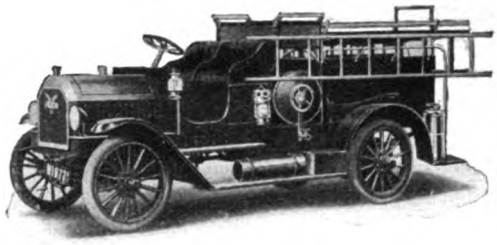
Victor Combination Hose and Pumping Engine



Victor Combination Hose and Chemical Truck

VICTOR

The Service Truck

It matters not the direction you go, the grades you encounter or the service in which you employ it—the Victor always goes through.

You are always certain of making deliveries on time when this is entrusted to a Victor Truck.

You are always certain that the Victor Truck will carry the load you purchased it to carry.

You are always certain that the accessible power plant of the Victor Truck will develop sufficient power to carry that load up the toughest grade.

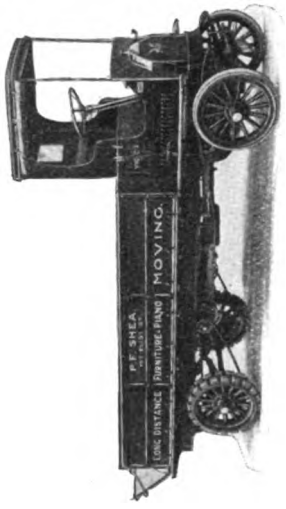
You are certain that the cost of up-keep will be comparatively low—the cost of your trucking and delivery lower—and your entire delivery service more certain.

You will experience a satisfaction that will cause you to constantly praise the Victor—purchase other Victors for additional service as required.

Built throughout to resist the strain of everyday service under the varying conditions met in every service. This is the Victor.

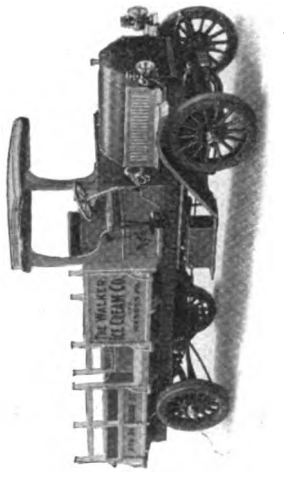
Write for catalog.

Victor One-Ton Truck



Victor Three-Ton Truck

Victor 1800-lb. Wagon



Victor Two-Ton Truck

Victor Motor Truck Company

Motor Trucks and Motor Fire Apparatus

1460 Niagara Street **Buffalo, N. Y.**

Victor Seven-Ton Truck

Victor Five-Ton Truck

Please mention the "Power Wagon" when writing to advertisers.

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The Burden Bearer in the Glidden

Red Head

FEDERAL MOTOR TRUCK COMPANY
MANUFACTURERS OF ONE TON TRUCKS

Subject: Detroit, Michigan, U. S. A., Nov. 9, 1911.

Emil Grossman Co.,
New York, N. Y.,

Gentlemen:—You might be interested in knowing that our one-ton truck which recently went through the entire Glidden Tour, carrying over a ton of baggage, was, like all Federal trucks, equipped with your Red Head Spark plugs.

This trip was exceptionally hard on account of the severe road conditions encountered. Through Virginia and North Carolina we had some very hard grades and very hard rains, and through Florida, heavy sands, so that our motor was working at maximum power and reliable ignition was absolutely necessary. We had absolutely no trouble with your plugs either from short circuiting or fouling, although at times, we found it advisable to use considerably more cylinder oil than we would use in ordinary service.

Yours very truly,
FEDERAL MOTOR TRUCK CO.
Per R. F. Moore.

RFM/FG.

RED HEAD Spark Plugs have **earned** a **regular place** in other high grade motor trucks by **proving** their efficiency and superiority. Used for the **third successive** season in Grabowsky trucks, and with absolute satisfaction by the manufacturers of the Kissel, McIntyre, Autocar, Hatfield, Atterbury, Mais, Modern Trucks, not to mention more than fifty automobile and gas engine manufacturers who use RED HEADS as regular equipment. The RED HEAD is powerful enough to bear your ignition burdens and efficient enough to solve your ignition problem.

All sizes—$1.00—Porcelain or Mica.

EMIL GROSSMAN COMPANY, Mfrs.
250 W. 54th Street, New York
Western Branch and Factory, 844 Woodward Ave., Detroit

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Lowney's — Mack

Pabst Brewery — Mack

The Fair, Chicago — Mack

Mack and Saurer

"Leading gasoline trucks of the world"

Wanted: *The* Man in each Locality

The Mack is the leading truck of America and the Saurer (now also made in America) the leading truck of Europe.

These are the only two trucks made in America which have been in practical use long enough to determine the most important fact of value in regard to trucks — whether they will last long enough to justify their initial expense.

The Mack has been built and used for 12 years; the Saurer for 17 years, and both trucks can well afford to stand on their records.

We have our own body building plant and are equipped to supply every kind of body for every purpose. The Mack is built in capacity of 1, 1½, 2, 3, 4, 5, 6, 7½, and 10 tons. The Saurer at present is built in 4½ and 6½ ton capacity.

Since the formation of the International Motor Company, agencies for Saurer and Mack trucks are being continuously applied for and arrangements have been made in a great many important centers. There is no difficulty in obtaining good agents to handle these leading gasoline trucks of the world — these trucks of proven value and service. This advertisement is meant for *the* man in each locality not covered at present, in order that a permanently valuable association may be formed for both him and ourselves.

He may or may not be in the automobile business. What we require is energy, sufficient capital and a determination to render his customers the service that every Mack and Saurer owner has a right to expect.

International Motor Company

General Offices: 1770 Broadway, New York

Works: Allentown Pa; Plainfield N. J.

Sales and Service Stations: New York Boston Chicago Philadelphia San Francisco St. Louis Los Angeles, and all other large cities

National Lead Co — Saurer

Keystone State Construction Co — Saurer

Great Atlantic and Pacific Tea Co — Saurer

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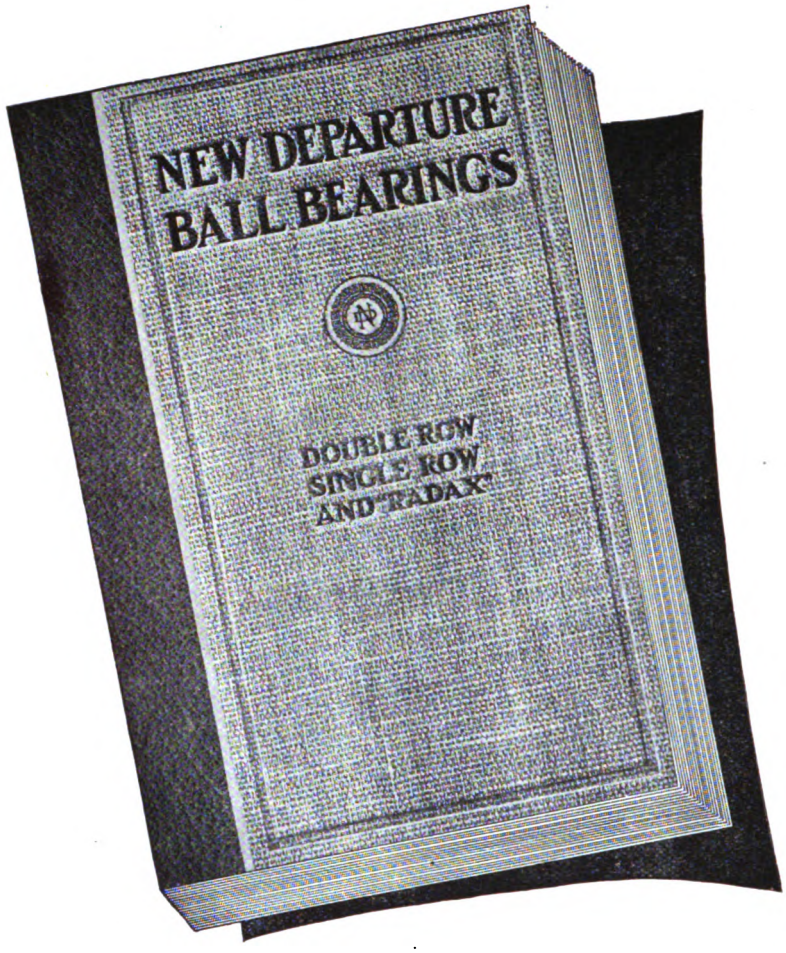

NEW DEPARTURE BALL BEARINGS

1912 Catalog---Treatise, Engineering Edition

A concise, comprehensive and complete volume prepared by our staff of engineers, particularly for automobile designers and builders.

It contains the following:

Detailed descriptions of the New Departure Double Row Ball Bearings, combined radial and thrust; New Departure Single Row Ball Bearings, high grade and strictly radial; New Departure "Radax" Ball Bearings, radial and axial, taking thrust in one direction only.

Fully illustrated exposition of ultra-precise methods for gauging during processes of manufacture and final inspection.

Treatise on the superior efficiency of New Departure Ball Bearings for all bearing points of motor vehicles of every description, illustrated by representative examples of advanced American and foreign practice.

Carefully worked out suggestions for mounting New Departures, proper care and lubrication.

Comprehensive colored charts for determining maximum and minimum radial and thrust load carrying capacity of all New Departure Ball Bearings.

Lay-out tables of size recommendations for all points of the car; a compilation reflecting extensive experience of leading engineers in the automobile industry.

Table of standard press and push fit on shaft and in the case. Full descriptive tables of New Departure Ball Bearings with all measurements given in both the inch and metric systems.

Inquiry blanks for purpose of furnishing data desired by our engineering department when giving co-operative consultation service. These blanks are supplemented by diagrammatic lay-outs of cars and are provided to facillitate inquiries.

A copy of this book will be mailed free on request, to any manufacturer, mechanical or designing engineer or purchasing agent.

Space 223 Balcony, Madison Square Garden Show
Directly Over the Main Entrance

THE NEW DEPARTURE MANUFACTURING COMPANY
BRISTOL, CONNECTICUT **Western Branch, 1016-17 Ford Building, Detroit**

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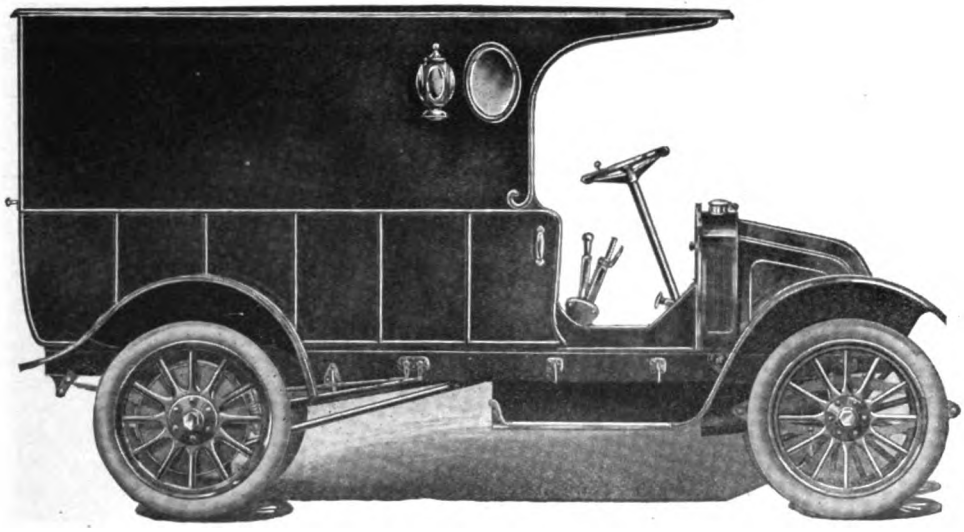


See What Great Value We Have Put Into This Commercial Car at $1675

Complete Line in One Chassis Size—1500 Pound Capacity—Bodies to Suit the Needs of Purchasers

Where else can you get so much value in a light commercial car as in the Lippard-Stewart? Where else can you find in a low-priced delivery car the following features that are offered in the Lippard-Stewart:

4-cylinder Monobloc Motor
Long stroke, slow speed, 3⅜"x4 5/16"; 22 h. p.

Selective Transmission
Three speeds forward and reverse; Vanadium steel, heat treated, gears 1" face.

Multiple Disc Clutch
Very simple and easy to take care of. Clutch case integral with transmission.

Special Timken Rear Axle
Full floating type; 5 to 1 bevel gear. 17" brakes; 34" wheels.

Left-hand Steering
With gear-shifting levers in center, driver can leave or enter car from either side.

Bosch Magneto, Single Ignition
Simplest form of ignition; no batteries, timer, coils, etc.

Thermo Syphon Cooling
No water pump and connections or belt-driven fan. Radiator at dash.

Special Spring Suspension
Full elliptic in front; long semi-elliptic and auxiliary coil springs in rear.

These Cars Set the Pace

Here is a line of delivery cars that sets the pace in the commercial car field. Here for the first time in a low priced commercial car you are offered all these up-to-date features.

It is no wonder that the Lippard-Stewart cars have met with a remarkable reception. The first announcement of these cars brought letters and telegrams from dealers all over the country. Merchants are waiting for just such a car as this—a car that is simple, strong, handsome to look at, serviceable, and at the same time economical both in purchase price and upkeep cost.

The Lippard-Stewart is the first real delivery car to be placed upon the market. It has been scientifically designed by experienced automobile men for commercial work. It was not built to meet a price, but was built to do the work, and by a company of men who are concentrating all of their ability and facilities on it. Their success depends upon the successful performance of the car. It is not a side issue.

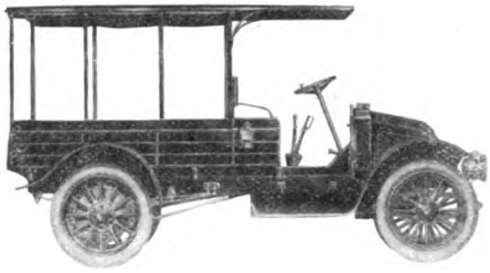
Our Organization

The Lippard-Stewart delivery cars are built by a strong organization—strong, first of all, in the men who compose it; strong also in resources and commercial standing. The men responsible for designing and building these cars have had years of successful experience in the automobile industry and in other lines of business as well. They not only know how to design and build good commercial cars; they know the needs of the merchants and others who buy these cars.

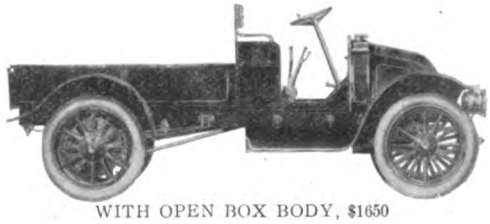
Lippard-Stewart Design

In design and construction the Lippard-Stewart is different from any other commercial car ever placed on the market; yet there are no freakish features; no experiments. It is a combination of the most modern and well tried out features known to the automobile world. Automobile experts have not been able to criticize it. These cars are so simple, so understandable that any intelligent horse driver, after a few lessons, can easily care for and drive them. Everywhere the designer's effort has been to eliminate complication. How well he has succeeded you will appreciate when you see the cars.

We invite you to see the Lippard-Stewart cars at the Grand Central Palace Show in New York, and at other automobile shows. Meanwhile, we suggest that you write, or wire, for our catalogue and full information regarding our proposition to dealers.



WITH EXPRESS BODY AND TOP, $1650



WITH OPEN BOX BODY, $1650

WITH PATROL BODY, $2200

LIPPARD-STEWART MOTOR CAR CO., Buffalo, N. Y.

AUGUST BECKER, Pres. T. R. LIPPARD, Vice-Pres. E. J. BARCALO, Treas. R. G. STEWART, Sec. and Chief Engineer

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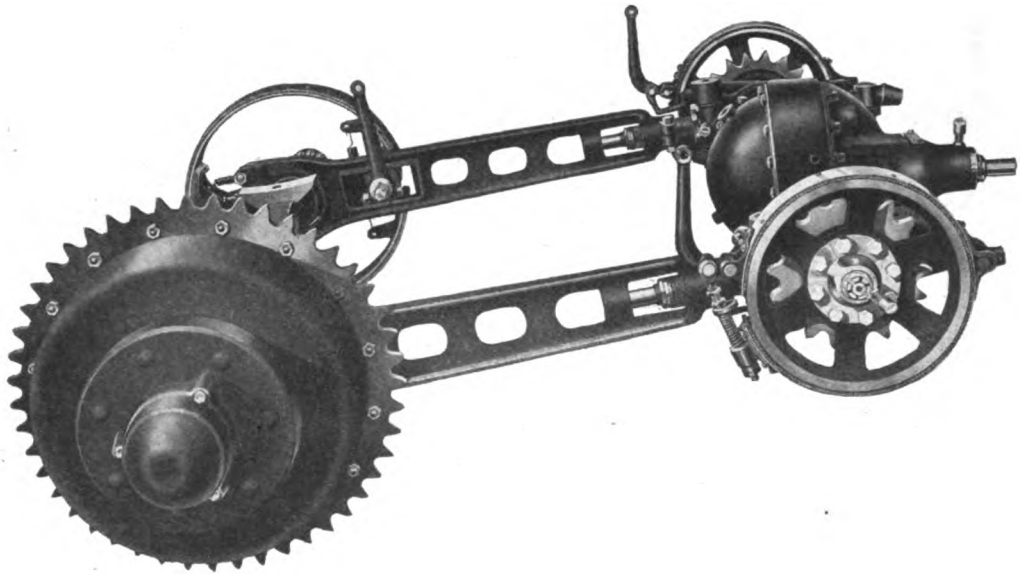

Jack-Shaft Service Brake on Timken Rear Equipment for Commercial Trucks

The Timken Service Brake is mounted outside the chain. *It is easy to reach for adjustment.*

Its large diameter and wide face give extra generous braking surface. *It holds like a bull dog.*

The broad steel band is anchored in a strong arm projecting from that part of the radius rod which swivels over the jack-shaft housing. *It is anchored for all storms.*

There is slight adjustable play in the anchor and in the support at the toggle, so the grip is strong and even. *The brake can't cramp.*

The lining of homogeneous asbestos and copper wire has proved in Timken experience to wear like iron and never over-heat. *It takes hold easy, but grips like metal on metal.*

Timken-Detroit Axles and Timken Roller Bearings will be shown January 6th to 20th in booths 165-166, Madison Square Garden, New York City. Drawings and full details of Timken Rear Equipment may be had from our engineering department any time.

THE TIMKEN-DETROIT AXLE COMPANY

DETROIT, MICHIGAN, U. S. A.

The only axle manufacturer licensed to make axles equipped with the famous Timken Roller Bearings.

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Full display of one of the most complete truck lines in America

YOU dealers who are looking for the truck line that is comprehensive to meet every need—you business men who have haulage and delivery problems—**don't fail to visit one of these Special KisselKar Shows.** These shows will be more than mere displays of models. They will be exhibits of modern methods of delivery and hauling.

Special KisselKar Shows

NEW YORK

Private KisselKar Show will be held at No. 137-141 Madison Avenue, cor. 31st St., **JANUARY 1st to 30th.**

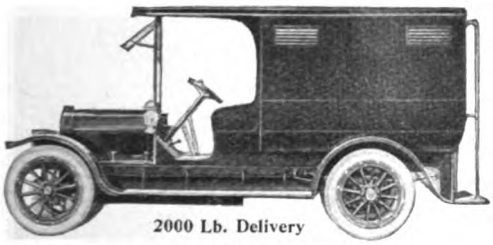
CHICAGO

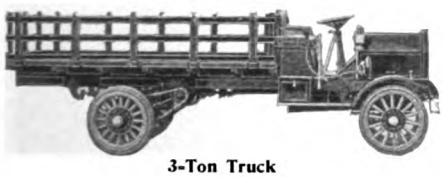
Private Show of full line, **2515** Michigan Ave. at the same time as the regular Chicago Show. We will also exhibit at regular Chicago Show as follows:—
Pleasure Cars—Section E1, 1st Regiment Armory.
Trucks, etc.—Section F, Coliseum, Jan. 27th to Feb. 10th.

KISSELKAR TRUCKS

1 1-2 to 2 Ton, 3, 4, 5 Ton Trucks, Delivery Wagons, Fire Dept. Hose and Chemical Wagons, Etc.

5-Ton Truck


2000 Lb. Delivery


3-Ton Truck

4-Ton Truck

These special displays will show the business man how to cut delivery and haulage costs—they will show the dealer how the cost-cutting abilities of the KisselKar line furnish the dealer with the sales ammunition that lands the orders. These displays will be far more interesting than the average exhibit. Cut out the square in the upper right-hand corner of this advertisement as a reminder, and visit one of these Special KisselKar Shows.

Reserve Power—Excess Capacity

While most trucks are powered only to handle listed capacity, KisselKar vehicles are provided with reserve power to handle excess loads and to master all road conditions—also KisselKar trucks have the structural strength to meet the occasions when stress of business necessitates extra heavy loading.

KisselKar Lock on the Differential

This KisselKar feature is almost indispensable for dependable service on the road conditions a heavy duty truck encounters in freight yards, on river fronts, etc. This lock on the differential prevents the stalling caused by one wheel spinning rapidly in a hole, in mud, on ice or snow. The driver simply applies a foot lever, locking both rear wheels together and equalizing distribution of power between both rear wheels. The wheel on solid ground supplies the traction and pulls out the truck.

Send for Special Truck Catalog

This is an informing book on power haulage and delivery—describes the entire KisselKar commercial line—**Free.**

Kissel Motor Car Co., 158 Kissel Ave., Hartford, Wis.

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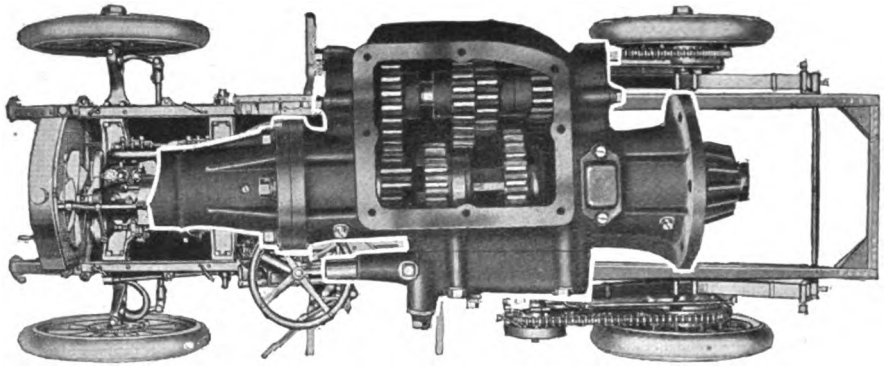
COVERT



TRUCK BUILDERS recognize the Transmission as THE PREDOMINATING FEATURE of a successful truck. Experience has proven the Covert Transmission a product of uniform high quality—a product that is dependable.

Materials of the very best grade—workmanship which has long become specialized—and years of experience in making transmissions, enables a better article to be produced at a lower cost.

There is a Covert Transmission for every type of automobile, both commercial and pleasure. While protecting you, they insure your customer. Manufacturers are invited to investigate.

We will look for you at the Madison Square Garden Show, New York.

COVERT MOTOR VEHICLE COMPANY
Sales Offices: Ford Bldg., Detroit, Mich.
Factory: Lockport, N. Y.

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MERCURY TRUCKS

Experience, resulting from more than ten years devoted to commercial car specialization, enables us to combine correct design with suitable materials and high-grade workmanship and produce cars of highest efficiency.

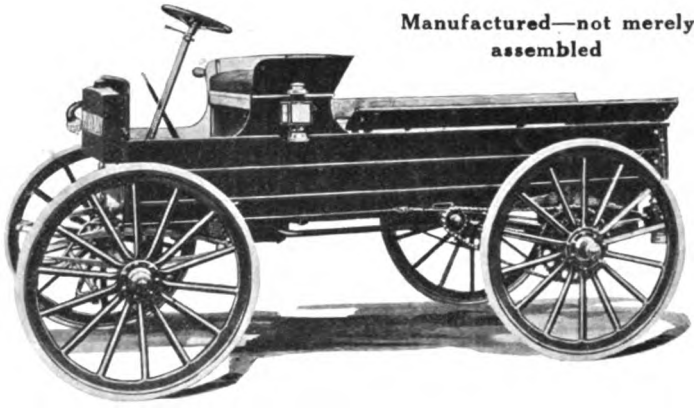
Mercury Trucks are commercial cars from the ground up, designed and built to stand to the continuous hard usage a business car is subjected to.

Delicate and intricate devices are eliminated, they are free from complicated mechanism and contain fewer parts to wear and get out of order than are found in the ordinary assembled cars.

They are of such simplified construction that any man or boy can operate and care for them—an experienced chauffeur is not necessary.

They are stronger and lighter and cost less to maintain than any other car on the market and will pay dividends in dollars and service to the merchant having goods to deliver.

Manufactured—not merely assembled



MERCURY MODEL P-I
(Open Express)
Complete, with Lamps, Horn and Tool Equipment
Price, $750 F.O.B. Chicago

One Mercury Truck will do as much work as from three to four horses, do it quicker and more satisfactorily and costs no more for upkeep than one horse and wagon.

Solid rubber tires insure Mercury owners against expense and delays caused by punctures and blow-outs.

Mercury air cooled motors have no water to freeze, no leaky radiators.

Always ready to go, every day in the year regardless of weather or road conditions.

They will deliver more goods over a greater area in less time and at less expense than anything else on wheels. Scores of merchants everywhere have increased the efficiency of their delivery service and are congratulating themselves upon the good sound business judgment they exercised in purchasing Mercury Trucks.

THOSE WHO DIDN'T—WISH THEY HAD

Catalogue and Booklet "WHAT THEY ARE MADE OF" Sent on Request

The Mercury Manufacturing Co.

4108 South Halsted Street Chicago, U. S. A.

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54 Service Stations—

One in your own Town, most likely—

are for the purpose of assuring Truck owners

PERFECT SATISFACTION

WITH

Diamond
Demountable Spliceless Wire Mesh Base Tires

We make it our business to see to it that Diamond Tire Service

MEANS 100% PLUS

The kind of efficiency you want is something more than tires, merely, and we understand that fact perfectly.

The Diamond Rubber Co.

AKRON, OHIO

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Ford Model T Delivery Car

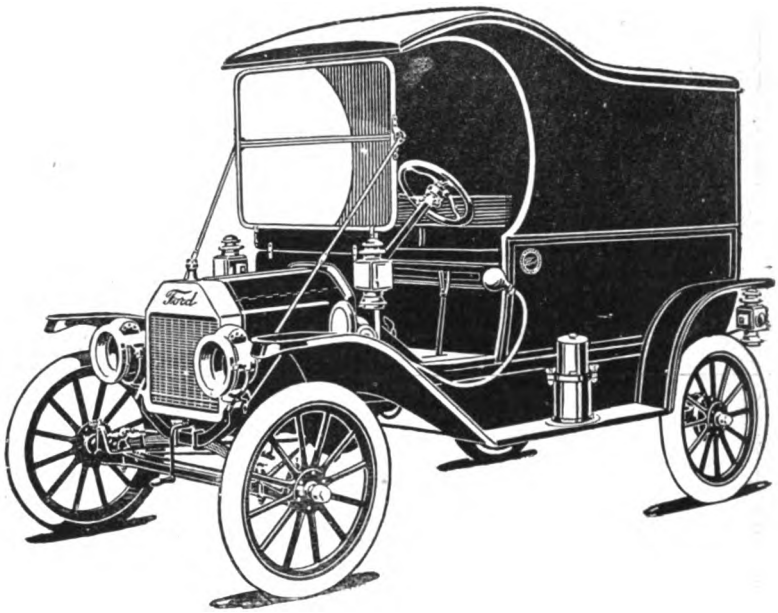
By reason of established efficiency this Delivery Car fits into the wants of business like the telephone. It extends your business. It is simple in design and strong in mechanical construction. Cheap in operation—a glutton for work—and sold at a price that has created an almost universal demand.

$700

Fully Equipped ***F. O. B. Detroit***

This price includes full equipment—Automatic Brass Wind Shield, Speedometer, Ford Magneto built into the motor, two six-inch Gas Lamps and Generator, three Oil Lamps, Horn and Tools. No Ford Cars sold unequipped.

Capacity of this Universal Delivery Car is 750 pounds of merchandise.



We did not offer Ford Model T Delivery Car to the business world until we had thoroughly tried it out in the very line of work that business makes for a Delivery Car. Now—after two years of experience in **delivering** merchandise—two years over city streets of all sorts—over country roads—in hilly territory in all sorts of weather—winter and summer—**we know** this car will "deliver the goods." We therefore recommend Ford Model T Delivery Car with our broadest warranty as a dependable, economical, durable, convenient, money-saving delivery car—for the big store, for the little store—for the city, town, village, or country.

The purchase price is low, and the maintenance—from facts established during continuous service—about **five cents per mile.**

At present we can make immediate delivery, but the way orders are coming in prompts the suggestion that you place your order without delay.

Ford Model T Delivery Car has the same Vanadium Steel Chassis which has made Ford Cars so practically useful and popular the world over. It has a handsome pressed steel body with a merchandise carrying capacity of 750 pounds.

Four thousand Ford dealers scattered all over the country will give your order prompt attention!

Fixed Prices on Quantity Orders for Ford Motor Cars for Commercial Purposes

To concerns who purchase Ford Cars in quantity lots for Commercial Purposes, we will give the benefit of a rate reduction or discount; we have fixed a sliding scale of prices which will be submitted on request. Catalogs and detailed descriptive literature will be mailed gratis. Branch Houses and Large Distributors in all Principal Cities—Dealers Everywhere.

Ford Motor Company

Detroit, Michigan, U. S. A.

Please mention the "Power Wagon" when writing to advertisers.

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POLACK TRUCK TYRES

by their **absolute guarantee** assure a lower cost per mile than any other tyre made.

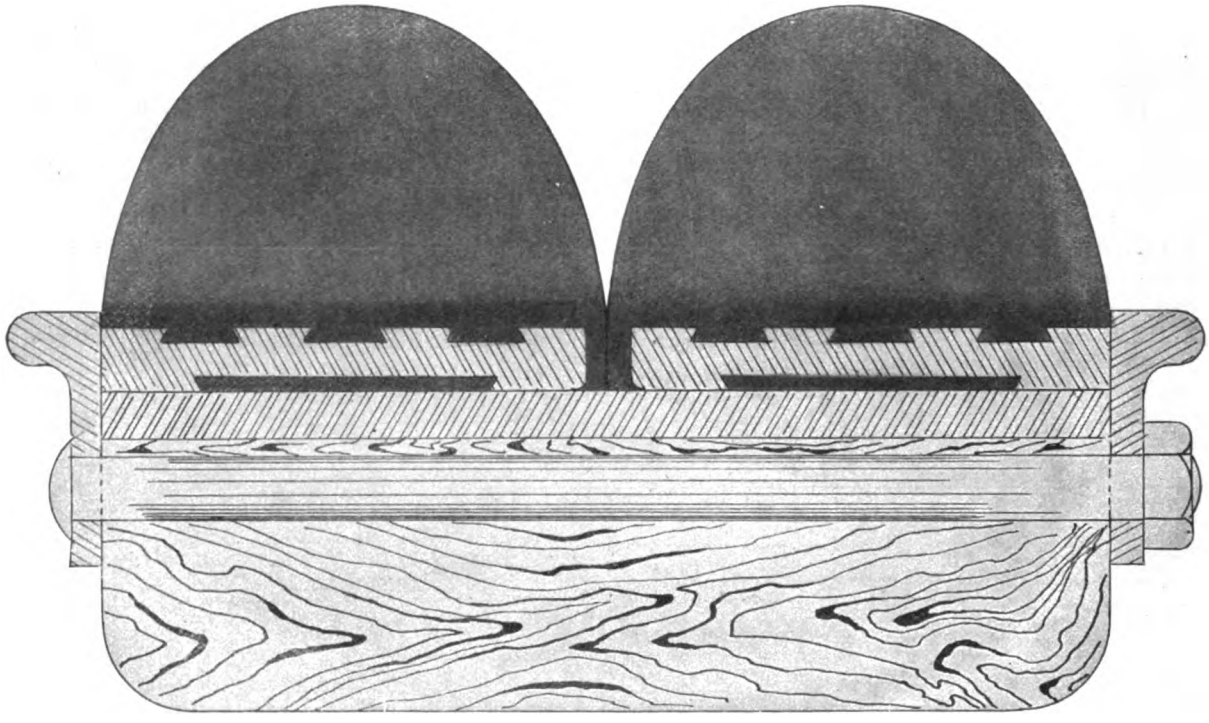
If fitted with the sizes which we recommend for a three-ton truck the tyre cost per truck mile is 5¼ cents, **maximum.**

For a 5-ton truck the **maximum** tyre cost is 7¾ cents per mile.

This cost will be reduced according to the additional mileage secured above the guaranteed service.

This additional service amounts to from 50% to 200% above the guaranteed mileage, according to road conditions and the care with which the truck is operated.

The costs published by experienced operators of trucks show an **average** tyre cost with other tyres of 8¾ cents to 11 cents per mile.



After January 1st, in addition to the present European standard sizes, Polack Tyres of the demountable type will be supplied in sizes to fit American S. A. E. standard wheels.

Polack Tyre Company

Ehret Building, Broadway and 59th St., New York

1004 Michigan Ave., Chicago
247 Jefferson Ave., Detroit
512 Mission St., San Francisco
146 Sumner St., Boston, Mass.
505 Liberty Ave., Pittsburg
917 First Ave. So., Minneapolis
930 So. Main St., Los Angeles
516 Parkway Bldg., Philadelphia, Pa.
Benoist & Aull, Benoist Bldg, St. Louis

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Velie MOTOR TRUCKS

Service Satisfaction

THE Velie Motor Truck is not an adaptation of pleasure car construction, but a commercial vehicle intelligently designed and built on the basis of service and satisfaction to the user.

No description however complete can depict the ease of operation, the accessibility of parts and strength of materials which in the Velie truck represent years of experience and trial and all that is good in motor truck manufacture.

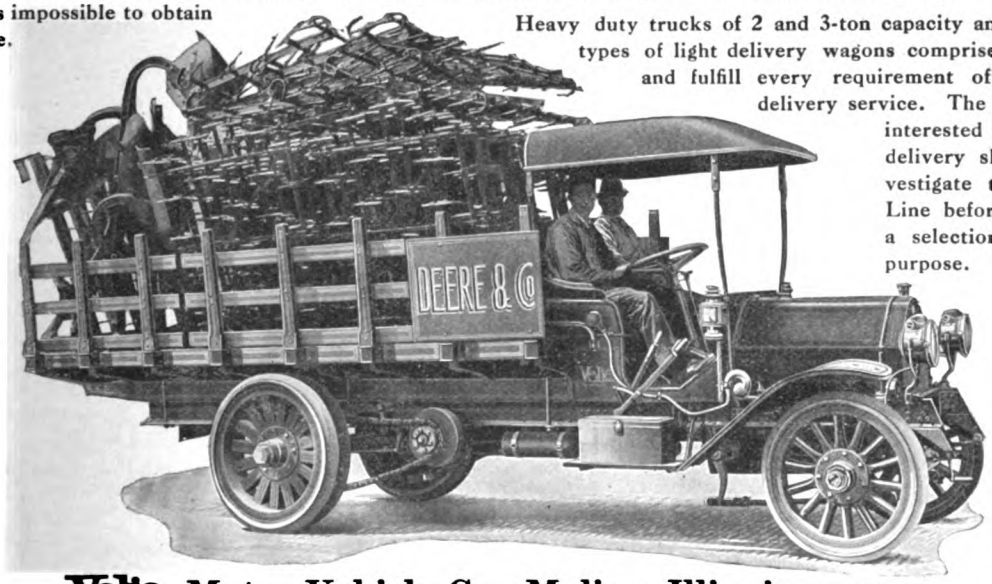
4½ x 5½ Heavy Duty Motor.
Sealed and Positive Governor Control.
6-in. I-Beam Frame—and Sub Frame.
4-in. Rear Axle—Timken Bearings.
Spring Cushioned Strut Rods.
Differential Lock—1¾-in. Side Chains.
18 x 3½ and 14 x 2½ Expanding Brakes.
40 x 5-in. Dual Tires—3-in. Square Spokes.
Bodies Suitable for Every Purpose.

The brief specifications as outlined above are sufficient only to direct some thought to the unusual features found in its construction and to warrant further investigation of its merit on your part before making any adverse decision in your purchase.

Velie Commercial Trucks will be Exhibited at Grand Central Palace Show, New York City, January 10-17

The worth of a guarantee is not only dependent upon the intent of the manufacturer and interpretation placed upon it, but upon the ability to serve as well.

Velie service is as much a part of the Velie Truck as its motor or tires. Backed by an organization of almost unlimited capital, built with the aid of a manufacturing experience extending over many years, and fostered by branches and service stations in every part of the country, its owner may be assured of consideration and attention such as is impossible to obtain elsewhere.



Heavy duty trucks of 2 and 3-ton capacity and several types of light delivery wagons comprise our line and fulfill every requirement of modern delivery service. The merchant interested in motor delivery should investigate the Velie Line before making a selection for his purpose.

Velie Motor Vehicle Co., Moline, Illinois, U. S. A.

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ALCO
Motor Trucks

What Do Your Horses Cost?

A Scientific Cost Analysis May Save You Annually From 15 to 40 Per Cent

THERE are 30,000,000 horses in use in the United States, representing in money value something like $3,000,000,000.

Few owners know what their horses are costing them—probably less than one per cent of horse owners know.

In other departments of a company's business costs are known to a penny—manufacturing costs, selling costs, and so on.

Why should not *horse* costs be known?

The possible saving as a result may run all the way from 15 to 40 per cent.

The way to find out is to put expert transportation cost accountants to work.

The best of them, as every one in the business knows, is W. P. Kennedy.

Mr. Kennedy is head of the new Transportation Cost Bureau of the American Locomotive Company, motor truck department. He has a corps of assistants — cost accountants, transportation engineers, expert horse men.

This bureau will *blue print* your horse transportation system—*without cost to you.* They will supply you with facts and figures. They will tell you how much your horses are actually costing you.

They will diagram your routes, time schedule the movements of your wagons, record how much time each day your horses are standing still, figure out the average life of them, and so on.

On your desk they will place a *picture* of your whole horse system. At a glance you will see your horse situation. The figures will tell their own unvarnished story.

This bureau will go further. It will determine if you can use motor trucks profitably. It will operate motor trucks in your service, reroute your hauls, eliminate waste of time loading and unloading. It will improve your method of handling merchandise or freight.

It will *chart* your complete transportation system with motor equipment.

In one composite picture, this bureau will display before you the saving of motor over horses — in dollars and cents—in figures and facts.

The amount of saving depends on the nature and extent of your transportation. The saving generally will average from 15 to 40 per cent.

Consider, for a moment, what a 15 per cent saving annually on your horse transportation expense would amount to.

What you should be interested in now is an *analysis* of your situation.

Why depend on your own confusing lack of information.

The matter of selecting a motor truck afterwards is not difficult.

If you are interested in an analysis of your transportation system — no matter how large or how small it may be—write today for information.

The service rendered by this bureau is without charge to you.

AMERICAN LOCOMOTIVE COMPANY, - - 1894 Broadway, NEW YORK

Builders also of Alco 6-cylinder and 4-cylinder Motor Cars and Alco Taxicabs

Chicago Branch: 2501 Michigan Avenue
Boston Branch: 567 Boylston Street

Movers of the World's Goods since 1835

AMERICAN LOCOMOTIVE COMPANY ALCO

Canadian Headquarters:
596 St. Catherine Street, West, Montreal

Capital, $50,000,000

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THE POWER WAGON

No. 86. CHICAGO, ILL., JANUARY, 1912. No. 86.

PUBLISHED THE FIRST OF EVERY MONTH BY THE POWER WAGON PUBLISHING CO
332 South Michigan Avenue, Chicago, Illinois.

WALTER WARDROP - President and General Manager
HENRY FARRINGTON - - - Editor

F. F. BARNET - - - Associate Editor
H. L. HISCHE - - - Eastern Representative

SUBSCRIPTION RATES

One Year (Domestic) - - $2.00
One Year (Foreign) - - - 3.00
Single Copies - - - - .20

EASTERN OFFICE
322 Thoroughfare Bldg.
1777 Broadway
New York City

ADVERTISING RATES UPON APPLICATION

Changes in advertising copy for the next issue to be in the office of publication not later than the 10th of the current month when proof is to be submitted, and not later than the 15th of the month when no proof is required

Entered as second-class matter December 2, 1907, at the Postoffice at Chicago, Ill., under the Act of Congress on March 3, 1879.

Statistics of the Industry.

Reliable Figures Showing the Distribution of Motor Wagons by Cities, and the Value of the Machines.

SO MUCH confusion of opinion exists with respect to the vital statistics of the motor wagon industry that it is well worth while at this period of development to register some reliable data obtained through the efforts of competent investigators.

The rapid expansion of the industry has evidently produced a race of speculators who juggle with figures, estimates and calculations in a manner that is little short of legerdemain. The undeceiving of the thousands over whom these people have exercised the sorcery of their spells has become a duty which, publicly discharged, should commend itself to executives who are in danger of being misled touching present or eventual trade conditions.

In the first place, the power wagon vogue is not local in character; it is almost as pervasive as the commerce of the country. But it must be admitted that its most gratifying commercial expression is found in the larger cities. If, however, one were to analyze the status of the motor wagon in the various geographical divisions of the country, he would find some very surprising conditions. For example, he would observe that with the exception of three large cities in the east, New York, Boston and Philadelphia, the great bulk of product is being applied in service in the middle western and western states. This discovery may not square with the common belief concerning distribution, which deludes us with the notion that the east, and the ease alone, is providing both the history and the argument for the employment of the motor wagon. The facts, however, stare one in the face and are good guides to future development.

In computing the number of motor wagons now employed in the country, two classes of statistics come into violent conflict. The ultra-conservatives experience great difficulty in accepting the record of sales achievement—largely on account of their unfamiliarity with its history—while the nimble-witted professional "boosters" scorn to be in the least degree precise over any matter affecting their bread and butter. Between the extremes of opinion represented by these two contending factions the truth lies, as this journal, with its accurate internal system of recording progress of the industry, is in position to prove.

At the present moment there are not less than 20,000 motor wagons employed in the country, of which number, as may be observed from the accompanying table, slightly more than one-half are performing work in 47

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cities. It will not severely tax the imagination to assume that the cities and towns not listed in this partial census might easily absorb the difference between 11,255 and 20,000 machines. A more vigorous, but hardly more conclusive, manner of putting the case would be to state that the "Power Wagon's" card record establishes the existence of the concealed remainder.

It is fully as interesting to learn, by consultation of the "Power Wagon's" statistical records, that these 20,000 machines are employed in the service of about 6,800 concerns, and that the total value of mechanical road transportation holdings is about $60,000,000. In assigning values to the motor wagon equipment in the various towns listed in the following table an average cost per vehicle of $2,500 has been assumed. Lest this arbitrary value should seem high or low, it is well to mention that for many years prior to 1910 the rating of machines in service throughout the country averaged close to 3 tons and that their valuation per vehicle was close to $3,500. It is only within the past few years that the small load model, selling at a relatively low price, began to multiply in numbers, a condition which makes it necessary to modify the gross valuation of machines now in service.

The figures presented in the following partial census are probably as accurate as the shifting conditions which attend an investigation of this sort will permit. It is a nice study in distribution, full of encouragement for all engaged in the industry, and clearly denoting that the resistance to the introduction of the power wagon is almost at an end:

New York City	2,500	$ 6,250,000
Chicago	1,300	3,250,000
Boston	800	2,000,000
Philadelphia	500	1,250,000
Buffalo	400	1,000,000
Cleveland	350	875,000
St. Louis	350	875,000
Detroit	300	750,000
Los Angeles	300	750,000
Portland, Ore.	300	750,000
Pittsburgh	300	750,000
San Francisco	300	750,000
Denver	275	687,500
Indianapolis	275	687,500
Kansas City, Mo.	250	625,000
Washington, D. C.	250	625,000
Minneapolis	200	500,000
Baltimore	150	375,000
Cincinnati	150	375,000
Newark	150	375,000
Rochester	150	375,000
Columbus	130	325,000
St. Paul	125	312,500
Syracuse	125	312,500
Trenton	100	250,000
Louisville	100	250,000
Springfield, Mass	100	250,000
Dayton	80	200,000
New Orleans	80	200,000
Hartford, Conn.	75	187,500
Oakland	75	187,500
Omaha	75	187,500
Harrisburg	70	175,000
Albany	55	137,500
Utica	50	125,000
Portland, Me.	50	125,000
Atlanta	45	112,500
Grand Rapids	45	112,500
Jacksonville, Fla.	45	112,500
Wilkes-Barre	40	100,000
Duluth	40	100,000
Youngstown	40	100,000
Des Moines	35	87,500
Wichita	35	87,500
Scranton	35	87,500
Toledo	35	87,500
Nashville	20	50,000
	11,255	$28,137,500

MOTOR WAGON TAX IN MEMPHIS.

City revenue officials of Memphis, Tenn., are looking around for some way to collect a privilege license from firms that use motor wagons. Many of the wholesale and retail business firms which formerly paid privilege taxes on horse drawn carts and wagons now use machines, and it seems that the revenue laws of the city have not kept pace with the commercial changes.

Accordingly the officials are preparing an amendment to the privilege tax ordinance so that motor wagons may be taxed.

The city now collects $5 per year for each one-horse wagon, truck or dray, $7.50 for each two-horse vehicle and $10 for each three-horse vehicle. The motor wagon does not come under such a provision. The only automobiling tax is that of $10 a year for each automobile for hire. Private autos, of course, are not taxable except as property.

Recently, it was stated from the office of the secretary of state, that Memphis has registered more than 1,800 gasoline and electric machines. The local revenue officials do not know how many of these are motor trucks.

EAMES SPEAKS AT BANQUET.

Hayden Eames gave an impromptu address on "The Motor Vehicle for City and State" at a banquet given by the Electric Vehicle Club of Boston, at the Boston City Club on Tuesday evening, December 19 last.

Commissioner Weatherly is planning to motorize the street cleaning department of Birmingham, Ala., and expects to effect thereby a saving of $4,000 a month over the cost of horses and mules.

St. Louis will have a motor truck show from February 12 to 17, 1912, at its Coliseum building.

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A Serious Problem.

Drivers' Wage Question Leads the "Power Wagon" to Propose a Motor Wagon Users' Association.

HOW MUCH wages should a motor wagon driver be paid? If a company has a fleet of 50 machines—and such installations are not at all uncommon, either in this country or abroad—and if $20 a week be paid to each driver when competent men may be obtained for $15 a week, the company is simply throwing away $13,000 a year, which represents not only a considerable loss in itself but also an appreciable difference in the percentage return on the total investment.

The manufacturers of motor wagons are perhaps even more vitally concerned in this wage question than the users, for the good showing of the machines is reduced in proportion as their operating expenses are increased.

At present the wages paid motor wagon drivers all over the country vary so greatly, even where the duties are alike, that it is high time to formulate some kind of a standard. Possibly this may be done on a national scale, but at least it ought to be done locally.

* * *

Table of Results Forms a Remarkable Study.

The accompanying table forms a remarkable study in many ways. In it are given the answers submitted by eleven motor wagon users to the questions which appear in the extreme left column. The table covers a small portion of a census recently undertaken by the "Power Wagon" on a national scale. The full results of this investigation are too voluminous to publish, but those which appear here are typical of the whole. It will be noticed that Pittsburgh occurs three times in the table. There is a reason for this, as will appear later.

An analysis of the table shows some almost incredible variations. For the purpose of comparison, we have taken as a basis the ton-mileage per $1.00 of driver's wage, although when the performance of a machine is considered from every standpoint, the ton-mile cost is anything but a reliable and equitable unit from the aspect of the scientific accountant, as we have pointed out before in these columns. The analysis which we make in the following, however, is necessarily anything but exact in individual cases, although on the whole it will furnish a fair standard for comparison.

Throwing out Rochester and St. Louis, for obvious reasons, and considering the New Orleans machines and the 3-ton and 1½-ton machines of the big Pittsburgh fleet separately, the effective ton-mileage per $1.00 of driver's wage works out as follows (Note: The full-load mileage is taken as one-third of the aggregate mileage): Cleveland, 9.33; Fort Worth, 21; Kansas City, 13.13; Louisville, 23.33; New Orleans, 12.46 and 10.22, respect-

QUESTIONS Answers ☞	Cleveland, Ohio	Fort Worth, Texas	Kansas City, Missouri	Louisville, Kentucky	New Orleans, Louisiana	Pittsburgh, Pennsylvania	Pittsburgh, Pennsylvania	Pittsburgh, Pennsylvania	Rochester, New York	San Francisco California	St. Louis, Missouri
How many gasoline motor wagons have you?	5	1	2	2	2	1	20	1	5	10	10
How many electric motor wagons?	0	0	0	0	0	0	0	0	2	0	50
What are their respective load ratings?	1½ tons	3 tons	3 tons	3 tons	3 tons and 1½ tons	1 ton	six 3-ton, twelve 1½-ton two rebuilt touring cars	1½ tons	one 2-ton, four 3-ton, gasoline; two 2-ton electric	5 tons	1½, 3, and 5 tons
What weekly wages do you pay your motor wagon drivers?	$15.00	$20.00	$16.00	$15.00	$14.00 and $12.00, resp.	$25.00	$15.00	$15.00	$15 to $18, according to length of service	$3.50 a day	$16 to $18
How many hours a week do your motor wagon drivers work?	54	60	60	70	60	60-70	72	54	54	10 hours a day, part day and night shifts	60
What time of the day do your motor wagon drivers report for work?	7.30 a. m.	6.30 a. m.	6.30 a. m.	7 a. m.	7 a. m.	8 a. m. at store	7 a. m.	7.30 a. m.	7.10 a. m.	6.30 a. m. and 6.30 p. m.	7 a. m.
Do your motor wagon drivers load and unload their wagons?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Are your motor wagon drivers expected to make repairs after their machines are in the garage?	no	yes	yes	yes	yes	yes	no	minor repairs only	minor repairs, and are paid overtime for them	no	no
What is the average daily mileage of your machines: (*a*) on long hauls; (*b*) on short hauls?	40	(*a*) 70 (*b*) 50	30	50	25 and 35, resp.	(*a*) 50 (*b*) 40	(*a*) 80-100 (*b*) 40-60	20	(*a*) 30-40 gasoline (*b*) 15 electric	(*a*) 75-85 (*b*) 40-50	20-40
In what way do you reward your motor wagon drivers for good records?	steady position	salary covers this	no merit system	yearly bonus, $100 to drivers, $25 to helpers	no rewards	no special way	in no way	..	no rewards	bonus system	no special reward
If drivers are supplied with helpers does this affect their wages?	no	no	no	no	no	no	no	..	no	no	no
What wages do you pay helpers?	$7.00	$15.00	$14.00	$9.00	$10.00 and $7.50, resp.	$12.00	$5-$10	..	$11 to $15, gasoline; up to $14, electric	$2.50 a day	$1.50 a day
Kind of business engaged in.	..	transfer	transfer	..	furniture	pianos	department store	paper	..	heavy trucking	brewery

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ively; Pittsburgh, 4.20, 32.67, 16.33 and 4.66, respectively; San Francisco, 35.

The average ton-mileage per $1.00 of driver's wage is 19.77.

The average hours per week of each driver is 65.

The average weekly wage of each driver is $16.78.

* * *

Highest Paid Drivers Sometimes Are Really the Cheapest.

Now here is a remarkable result: Counting out the Pittsburgh piano motor wagon driver who does his own repairs and receives $25.00 per week, the highest paid drivers in this list are in San Francisco, and yet, considering the work they accomplish, they are easily the cheapest. The San Francisco motor wagon owner moves 35 tons through a distance of one mile for a cost of $1.00 for driver's wages, whereas the Pittsburgh piano merchant has to pay $1.00 in wages to his driver for moving only 4.2 tons through a distance of one mile. This, however, is with a 1-ton machine. But the Kansas City operator with a 3-ton motor wagon moves only 13.13 tons through one mile for $1.00 in driver's wages.

What is the answer? Is it a result of paying the driver inadequately? Possibly, but not at all probably. The chief reason seems to be that the fullest advantage is not taken of the load and mileage capacities of the motor wagons.

* * *

Driver Problem Really an Administration Question.

From statistics collected from all over the world for a period of many years, it appears that the average mileage of motor wagons of all load capacities and in all classes of service should be at least 60 miles a day in order to keep the machines working at the most economical efficiency. In the table given herewith it will be noticed that only three out of eleven installations operate at anything like maximum efficiency under given conditions. The fleet of 20 motor wagons employed by the Pittsburgh department store, and that of 10 machines operated by the San Francisco heavy trucking concern are the best examples.

The second and third Pittsburgh installations given in the table show a remarkable contrast. In the former case the average daily mileage is about 70; in the latter it is only 20. And yet the wages paid the drivers are the same. But in the one case the weekly hours of labor are 72, as against 54 in the other. Naturally the diversity in business of the two concerns has a great deal to do with this tremendous disparity; still even this will not account entirely for the enormous difference in operating results.

Thus it is apparent that the wage question is intimately related to the administration problem, which brings us immediately to the essential consideration that organization of motor wagon users is urgently needed. If this were done in all large cities, the motor wagon users could get together and, on the principle that many heads are better than one, they could formulate some kind of a standard for paying drivers according to scale. They could also learn much from one another about the best methods to be employed in obtaining the maximum efficiency from their machines. Ultimately, and perhaps even from the outset, a national body of motor wagon users could be formed. The electric central stations and manufacturing interests have their National Electric Light Association and various local state organizations. The street railway companies have their association. In fact, practically all the great operating industries are organized in one form or another, so why not the motor wagon users?

* * *

A Motor Wagon Users' Association.

Such local or state institutions, or the national body, could do a great many more things than merely standardize the operation of motor wagons. They could prevent unjust discrimination in the matter of wheel taxes. They could compel legislation for the better paving of streets and highways, the strengthening of bridges and the abolition of iniquitous toll gates which still exist in large numbers in this country. They could hire the best legal talent for the prosecution or defense of cases arising from the use of motor wagons, and legal precedent could be established for the definition of all third-party liability causes. They could compel railroad companies to provide special terminal facilities for the efficient handling of goods for motor wagon transportation.

These are immediate needs, and others would soon suggest themselves from time to time as motor wagon operation becomes more universal. At present, most of the owners have not broken away from the association of the horse. They do not know how to route their machines, how to load and unload them, how to schedule them according to speed and distance. Their haulage and delivery problems, in short, have only partly been motorized; they have not learned to adopt machine methods in the problems incidental to the operation of motor wagons. Small wonder, then, that they have no idea how to pay their drivers, for the men themselves in most cases have not been speeded up in their methods of working to the capacity of the machines they operate.

There is good precedent for the establishment of the Motor Wagon Users' Association. A similar body has long been in active operation in England. Membership for the nominal fee of one guinea (about $5) entitles one, among other things, to expert legal defense and advice, associateship in the Royal Automobile Club of Great Britain, and information from the association on motor wagons. Surely what they can do in Great Britain we can do here just as well, if not better.

The "Power Wagon" is ready to sponsor any such movement and from its unequaled and invaluable records to assist participants in every way possible. We invite correspondence on this point, and will be glad to open up our columns for discussing the subject from every angle.

Springs are the greatest trouble on the London motor buses.

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PROFESSOR JOHNSON PASSES AWAY.

Jack of many trades and past master of them all—to invert a well known saying—is the aptest description that can be applied to Professor Warren S. Johnson, of Milwaukee, founder and head of the Johnson Service Company of that city, who died peacefully on December 5 last while on a visit at his brother's residence in Los Angeles, Cal.

Professor Johnson was born in Vermont on November 6, 1848. He came to Wisconsin in 1883 and was professor of drawing history and natural science at the Whitewater Normal school. Shortly afterwards he invented the automatic temperature regulation, being the first to make a successful system. This invention consisted of an electric thermostat with electro-pneumatic valve.

He formed the Johnson Service Company in 1885, and in 1893 perfected his temperature regulator to such a degree that the element of electricity was eliminated. From then on the business grew and the regulator has become an accessory of most offices and institutions. The company now has 25 branch offices in the United States and abroad.

Other inventions by Professor Johnson were the brass foundry furnace, gasoline gas machine, pneumatic clock and time system, wireless telegraphy accessories, various automobile parts and other devices conforming with the business in which he was engaged.

Some of his notable achievements were: The pneumatic floral clock at the St. Louis world's fair in 1907; clock in the city hall at Philadelphia; the city hall clock in Milwaukee, the bell of which is the largest in the world.

Four years ago the first automobiles used in the postal delivery service of the United States were furnished by Prof. Johnson and experimented with in Milwaukee. They were accepted and the company still holds a government contract.

For some time past, prior to his leaving for California, Professor Johnson made the Milwaukee club his home.

He was a member of the Franklin Institute, the American Society of Mechanical and Electrical Engineers and the American Society of Heating and Ventilating Engineers.

MILWAUKEE SHOW.

Thirty motor wagon makers and 51 accessory manufacturers will exhibit at the Milwaukee Automobile Dealers' second annual show, which will be held at the Auditorium, Milwaukee, Wis., on January 13-19 next, inclusive. Two concerns manufacturing bodies will also exhibit.

A small house was recently set on fire to afford a test of the motor chemical recently installed by Mount Vernon, N. Y. The machine made the run from one side of the city to the other at 35 miles an hour, and put out the fire, all in 15 minutes.

ELECTRIC ROAD ROLLER.

An electrically operated road roller is used by George Stump, a contractor of Independence, Kan., according to "Engineering News." It has a rear roll 4 feet in diameter and 4.5 feet wide and a front roll 3 feet in diameter by which the steering is done in the usual way.

The whole machine weighs 7.5 tons. A 10-horsepower, 220-volt, single-phase motor is mounted with its shaft running back to a transverse shaft, from the ends of which the rear roll is driven by chains. During ordinary operations the motor runs all the time and the movement back and forth of the roller is controlled by clutches.

The roller is supplied with current through 160 feet of flexible cable from a portable step-down transformer mounted on cart wheels. The primary side of this transformer can be tapped on to any 2,300-volt, single-phase distribution circuit in the neighborhood of the street to be rolled, and the flexible cable is long enough to permit of the machine moving through 300 feet. When the roller is to be used at a short distance from the existing transmission lines the central-station company puts up the necessary poles quickly at cost for the contractor.

The transformer cart carries a watt-hour meter and current is supplied at 10 cents per kilowatt-hour. The cost of operating the roller is said to be $6 a city block.

RECEIVER FOR TAXICAB COMPANY.

The Blue Taxicab and Baggage Company, of Kansas City, Mo., has been placed in the hands of a receiver. The attorney for the company has formally protested against this action as being unwarranted and unnecessary.

Application for a receivership was filed by the Faeth Iron Company. It is alleged that, while the capital stock of the company represents $100,000, more than $23,000 worth of stock remains unsold. The company, it is charged, has been mismanaged by officers who are wasteful of its assets. The company is said to owe in excess of $30,000. A number of notes will mature shortly.

INTERESTING LEGAL POINT.

An interesting legal point is being argued in Newcastle, England, where recently five motor cab drivers were charged in the local courts with having left their vehicles unattended while they were getting a meal. It was contended that the law applying to horse vehicles did not hold in the case of motors, as the latter were in no danger of running away when left alone, especially if the engines were stopped.

Indianapolis spent $25,000 in 1911 for motor fire apparatus. Twice that amount will be expended in 1912 if funds are available.

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Instructive Advertisements.

Illustrations Which Afford Some Idea of the Motor Wagon's Values from Other Than the Economic Aspect.

NOTWITHSTANDING the openness of the winter up to the present, the department stores and other city establishments using motor delivery wagons have cashed in heavily on their investments in motors. The bulk of the Christmas shopping went to those up-to-date merchants who could guarantee prompt and quick deliveries by reason of having adequate fleets of motor wagons.

Nor were these live factors loath to take advantage of the advertising value of their motor delivery systems. On this and the opposite page are reproduced on a small scale a few of the advertisements which appeared by the dozen in the newspapers of every great city in the country during the week or so preceding Christmas. The three most striking examples of those given are the advertisements of the "Fair" store (shown on this page) and those of Lyon & Healy and Marshall Field & Company (on the opposite page). These "ads" promise quick delivery by motor wagons, of goods purchased up to the last minute, practically, before the close of the stores on the Saturday night preceding Christmas on the Monday following. There is little or nothing in them about the goods the stores have for sale. The quality of the goods seems to be taken for granted when the firms show their modern spirit by using the cheapest, quickest and most reliable form of delivery.

Chicago is a great city. It covers a tremendous area. But not even the most rabid admirer of the horse would admit that animals could make deliveries such as are guaranteed in these advertisements. Only motor wagons could do it, and the logical deduction is that any city merchant who has to make deliveries must use motors or get left hopelessly in the rear in his competition with rivals who have machines.

If a snowstorm had blocked the traffic during Christmas week, the superiority of the motor wagon over the horse would have been even more pronounced. There was a fall of a few inches of snow in Chicago, but it melted quickly and did not affect traffic for more than a few hours, and that was before the holiday rush had really set in. In New York there was a small blizzard on December 4. This gave the John Wanamaker store a chance to come out the next day with a large advertisement in the New York papers telling the public about "The Delivery System That Stood the Test of the First Blizzard." In this announcement the store called attention to the fact that in the face of the storm, all deliveries went out on schedule from its distributing stations to such remote points as Stamford, Conn., Greenpoint, L. I., Plainfield, Morristown and Englewood, N. J. This extraordinary feat was accomplished with a fleet of 58 vehicles, including ten large gasoline motor wagons that carried the packages in bulk to the suburban stations, whence they were distributed.

On December 7 last, the New York store of Gimbel Brothers devoted nearly one-third of a newspaper advertisement to its motor delivery service. This big store uses motors exclusively and operates a fleet of 135 motor wagons in all, including 75 electric and 30 gasoline delivery wagons, and 30 heavy gasoline and electric motor trucks. One of the clever lines in this advertisement stated that "No blizzard can stop Santa Claus when he starts

ESTABLISHED 1870 BY E. J. LEHMANN
THE FAIR
STATE, ADAMS AND DEARBORN STREETS
TELEPHONE PRIVATE EXCHANGE 3
STORE OPEN TO-NIGHT & TO-MORROW NIGHT
We Will Deliver
EVERYTHING
purchased Saturday and Saturday evening as follows:
All goods bought Saturday up to 7:30 p. m. will be delivered within the following limits:
South: as far as 79th-st., Ashland-av. to the lake
West: to 46th-av., North-av. to drainage canal, as far as Harlem-av., North-av. to 12th-st.
North: to Noyes-st. (Evanston) Western-av. east to the lake
Northwest: as far as 48th-av. and Lawrence-av.
All goods bought Saturday up to 3:30 p. m. will be delivered within the following limits:
South: as far as 138th-st., 40th-av. to the lake
West: to Melrose Park and Riverside
North: as far as Winnetka
Northwest: to Des Plaines and Franklin Park
All goods bought after 7:30 p. m. Saturday will be delivered Tuesday, Dec. 26.

This advertisement, used freely in the Chicago papers just before Christmas, did much to induce "last minute" shoppers to patronize the "Fair" store. It is interesting to note that the reason of this motor wagon boost was the appearance of the Marshall Field & Company's advertisement—shown on the opposite page—which appeared in the newspapers two days earlier. It shows the value of the competitive spirit among store keepers in making trade rivals follow one another's lead.

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The business of Lyon & Healy largely exceeds in volume and value that of any other musical establishment in either Europe or America.

We Deliver Up to the Last Minute

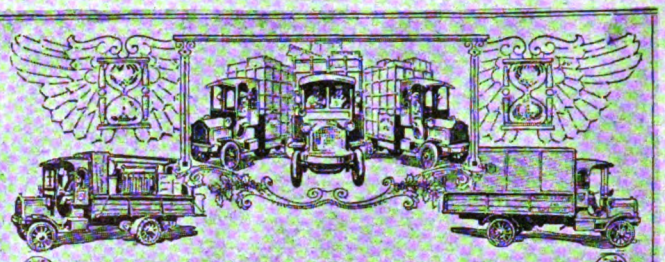
Your Christmas Present will be *SENT OUT IN TIME* if purchased here any time before 9 P. M. Saturday evening, December 23

Pianos, $99.50 and up. Victrolas, $15 and up. Violins (with case complete outfit) $3.50 and up.
Mira Music Boxes, $15 and up. Mandolins, $2.50 and up. Phonographs, $15 and up.

Lyon & Healy

Easy Terms. We will gladly allow monthly payments when desired.

OPEN EVENINGS — WABASH AVE. AND ADAMS ST. — OPEN EVENINGS



In These Four Days Before Christmas

IMMEDIATE DELIVERIES OF CHRISTMAS MERCHANDISE

Will be made by our great Motor Trucks, Automobiles and Wagons to all parts of the city with the same promptness that characterizes our normal service.

SATURDAY AFTER THE CLOSING HOUR—SIX O'CLOCK—WE WILL COVER THE ENTIRE CITY

Our shipping room system in every detail of its organization and equipment is now at highest efficiency. Every purchase will be on its way to destination in the shortest possible space of time. Great Motor Trucks, each carrying deliveries of Christmas merchandise for 10 to 30 wagons, will leave the store almost hourly. They place the fifteen substations in residential districts within twenty minutes to an hour and thirty minutes' time of the store. Here these trunks are transferred to waiting wagons covering their districts from three to five times.

So our Great Delivery System is up to the minute in readiness for each day's business in these remaining four days before Christmas.

MARSHALL FIELD & COMPANY

ESTABLISHED 1875 BY E. J. LEHMANN

THE FAIR

STATE, ADAMS & DEARBORN STREETS—TELEPHONE PRIVATE EXCHANGE 3

IMMEDIATE DELIVERY OF ALL CHRISTMAS PURCHASES

Christmas shoppers can make purchases at The Fair with the assurance of having them delivered immediately. We've increased the size of our shipping floor, have added several big and swift motor trucks and perfected our shipping organization to such a wonderful extent that we are prepared for the biggest kind of rush. No one who buys here will suffer delay or disappointment.

SOUVENIRS

AUTO DELIVERIES — OPEN EVENINGS
SEND FOR OUR CHRISTMAS BOOK

Harlem Store 125th St. on 5th Ave.
Brooklyn Store, 929 Broadway

Six Stirring Shopping Days

TO DO THE CHRISTMAS BUYING

This Vast Store, with Its Wealth of Christmas Stocks and a Thousand Extra Salespeople, Will Give Best and Promptest Solution for All Christmas Problems.

The Gimbel Delivery Service (entirely by Motor Cars) Is the Best in Existence Today, and Reliable Under ALL Weather Conditions, in City and Suburbs. Come as EARLY in the Week as You Can—and EARLY IN THE DAY. Store Closes Daily, as Usual, at 6 P. M.

A Gift That Grows

Exquisite Ostrich Plumes & Paradise

Daily Free Deliveries by Fast Auto Trucks to All Parts of the City.

WRITE FOR CATALOGUE NO. 6.
WE PAY THE FREIGHT.
NO CHARGES FOR PACKING. GOODS HELD FOR FUTURE DELIVERY WITHOUT CHARGE.

Manufacturers' Outlet
MARCUS & KLEMPERER CO.
510 So. Wabash Av.

We make no charge for crating or shipping.
Goods delivered by Automobile Trucks.
Out of town people, send for our Catalogue No. 12.
Be sure to come in the right store, 524 S. WABASH-AV.

GRAND RAPIDS FURNITURE & RUG CO.

Reduced facsimiles of newspaper advertisements used by Chicago and New York merchants who proved themselves to be keenly alive to the prestige of quick and prompt delivery by the motor wagon fleets during the rush times of the recent Christmas shopping season.

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from Gimbel's." Which would seem to indicate that Santa's famous reindeer team seems to have been discarded, in up-to-date communities, in favor of the modern power wagon.

With the opening of its large new department store in New York, the firm of J. L. Kesner & Company announced in large display newspaper advertising: "Our Specialty is Service," and then went on to say that its up-to-date motor delivery system would take care of every order promptly, even if the second day should prove bigger than the opening day..

In Chicago, Siegel, Cooper & Company announced in the papers: "Our automobile delivery service is equipped to meet all holiday demands promptly," and on another day, "All Christmas purchases will be delivered promptly and accurately in Chicago and suburbs—our automobile delivery system is equipped as never before to care for all demands." Mandel Brothers, just under the head of its full-page newspaper advertisement, displayed the line: "Our rapid motor car service insures the delivery of all Friday and Saturday purchases promptly—in full time for Christmas." And there were plenty of others.

Now, although the first appeal to the public is naturally "Service," there is another point worthy of notice by the advertising managers of our great stores. The fact that motor delivery is also much cheaper than horse delivery is deserving of mention. Naturally, a concern that cuts down its own operating expenses to the lowest point can afford to give the public better value for its money than an expensively operated company. Thus, if a concern can advertise: "We are saving $20,000 a year in operating costs by having discarded our horse delivery system in favor of motor wagons, and we are putting just that much more value into our goods without increasing the price,"—or somethink like that,—it would make people patronize that company's store even in times when promptness in delivery is not of such importance as during the Christmas season. So far this thought seems to have been overlooked. At any rate the idea is worthy of exploitation.

MOTOR BUSES FOR MAIL CARRIERS.

In Washington, D. C., a new departure in collecting and distributing mail was inaugurated recently when the Postoffice Department put in service three large motor buses, each one capable of carrying ten letter carriers with perfect ease and comfort.

The buses, which were manufactured by the H. H. Franklin Manufacturing Company, of Syracuse, N. Y., are painted a dark blue with the words "United States Mail" in gold lettering on either side. The entrance for the carriers is in the rear.

Postmaster General Hitchcock, who is determined that Washington shall have every facility for the most up-to-date mail service, originated the idea of the use of the motor buses.

They will be operated 16 hours a day and have already not only demonstrated that they will land the carriers on their routes about 15 minutes earlier than heretofore, but they are ably taking care of collections and delivery in sections of the city where the carriers were handicapped before. The service is operated by David S. Hendrick, the Franklin dealer in Washington, who is under a four-year contract to supply the Postoffice Department with motor buses.

The Postmaster General is very well satisfied with the work being done and it is not unlikely that all the postal delivery districts of Washington will eventually be furnished with motor vehicles.

Motor bus service as an aid in cutting down the time necessary for carriers and collectors to reach their routes is being seriously considered by a number of postmasters in the larger cities. The new service inaugurated in Washington is being watched with interest by postoffice authorities and its continued success may mean a reversal of present delivery conditions.

SNOW REMOVAL AND THE MOTOR TRUCK.

Under the above caption and date of December 6 last, the "Journal of Commerce and Commercial Bulletin" prints the following "letter to the editor":

> Sir: Your column of December 5 headed "Snow Made a 'Mess' of City Trucking," with the coincident news of the loss by fire of about 350 horses suffered by one of the large express companies, moves me to record my hope that this company will in the process of re-equipment patronize the motor vehicle.
>
> My interest lies not in the motor line in any degree, although I think the adoption of power trucks by the express companies would mean increased efficiency.
>
> I am actuated entirely by a humane concern for the horses employed in such service. The importance of dispatch renders it apparently necessary to keep these animals continually on the trot, loaded or not loaded. They are splendid specimens to begin with, and are doubtless as well treated as circumstance will allow, but how much better it would seemingly be to delegate this labor to that tireless product of man's own ingenuity—the motor vehicle!
>
> Does not the innovation lie within the means of the express companies?

TRACTORS FOR N. Y. FIRE DEPARTMENT.

New York is testing several makes of motor tractors which are hitched to the front end of existing horse equipment. According to Fire Commissioner Johnson, some of the best informed men in the New York fire department are in favor of this plan.

New York intends to spend $750,000 on motor fire apparatus between now and next March, and expects by that time to have 150 fire motors of various kinds. The tractor idea would be the means of saving a lot of the old apparatus for future service.

Motor fire apparatus and waterworks extensions, combined, have been the means of causing the fire insurance key rate for the city of Texarkana, Tex., to be reduced from 64 to 33 cents.

Cincinnati plans to spend upwards of a quarter of a million dollars in improving its fire-fighting facilities, much of this money being for motor fire apparatus.

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Motor Fire Apparatus.

Power Wagon Makers Have a $75, 000,000 Business Simply Crying Out for Development.

OVER $3,000,000 has already been invested in motor fire apparatus in this country. A recent census by this journal showed that 301 cities and towns in the United States have 594 motor driven fire apparatus of all kinds already in service, each piece being worth anywhere from $3,500 to $10,000, the aggregate value being a trifle over three millions.

In all the history of finance no better investment than this three millions has ever been recorded. And in no other branch of activity has the motor vehicle a more undisputed and proved superiority over the horse. The people whose property is insured by the motor apparatus against destruction by fire, the fire insurance companies who are directly concerned in fire protection, and the fire chiefs and firemen whose business it is to put out fires—all these are a unit in declaring the efficiency of the motor, from every standpoint, and its unquestioned superiority over the horse.

Every motor wagon maker who builds a chassis of 4,000 pounds capacity or over has an enormous potential field for development in the manufacture of motor driven fire apparatus.

* * *

$75,000,000 Worth of Business in Sight.

In the United States, according to the census of 1910, there are 6,225 cities and towns with a population of 2.000 or over; there are 3,553 with a population of 3,000 or over; there are 1,858 with a population of 5,000 or over; there are 842 cities with a population of 10,000 or over; there are 320 cities with a population of 25,000 or more; there are 131 cities with a population exceeding 50,000; and 43 cities have a population of 100,000 or over.

These, then, are the possibilities. Each of these cities and towns, on the average, needs two motor driven fire-fighting machines. The whole country, according to this estimate, which is derived from present statistics, should have a total of 12,450 machines. There are only 594 of them already in service, which leaves a balance of 11,856 still wanted. The value of these is in the neighborhood of $60,000,000.

Present indications show that this business will be absorbed by the motor wagon industry well within the next ten years. But in that time the population of the country will have increased by about 25 per cent, and fire protection will have to increase by a like ratio. Hence, the market for motor fire apparatus for the next ten years is certainly not less than $75,000,000.

* * *

Pressure of Public Opinion Helps Fire Motor Business.

All the developments of the last few years are in favor of motor fire apparatus. Improved methods of intercommunication, notably the electric trolley and interurban lines, the telephone, and the increasing radius of the delivery service (by motor wagons) of the great city department stores, have induced people to move out from the congested areas in the cities to the suburbs. The density of city population is decreasing, but the area is increasing enormously. Outlying districts are being built up and the people in them are isolated from fire protection facilities. The horse-driven fire apparatus is thus automatically rendered obsolete, for it simply cannot cover the distance in a reasonably short time. The only alternative is motor apparatus. The people themselves realize this, for in numerous cases have fire motors been purchased by popular subscription, and in several cases even on the installment plan. Public opinion is thus in favor of the motor, and what the public wants it gets, sooner or later. Thus it behooves the motor wagon factors to go after the business which is waiting for them. If they do not want to make the fire equipment themselves they can buy it from specialists who are already well established in this line of business. The motor wagon makers will have the greater profit, for it is the chassis that is the most important and expensive part of the output.

* * *

Economic Values of Fire Motors Incalculable.

The economic advantages of the motor fire apparatus are almost illimitable. It has been calculated that the $3,000,000 already invested in fire motors is paying dividends of hundreds per cent every year to the American people. Naturally, the total saving is impossible to estimate, but a direct idea of the value to the public of motor fire apparatus is conveyed by the action of the insurance companies, which in numerous cases have voluntarily reduced their rates for fire insurance when motors have been installed. In several cases this reduction has amounted to over 50 per cent.

The saving in fire insurance premiums alone is greater each year than the total cost of all the motor fire apparatus installed up to date. This may sound absurd, but it may easily be verified. A motor hose and chemical engine costing $5,000 will cover an area of 22 square miles of average city. A reduction of ten per cent in the fire insurance premiums on property covering this area would represent an amount of money sufficient to buy not one but ten machines every year at the price assumed. And in the estimate, which is averaged for the whole country, the most conservative values were taken in arriving at a result.

But this does not even begin to exhaust the economic possibilities of the motor fire apparatus. In the cost of administration and upkeep the motor is very much more economical than the horse. The following instances of the motor's superiority are taken from actual practice, and these are only a few of many scores of which we have record:

* * *

Fire Motor Economy in Lansing, Mich.

Fire Chief Hugo R. Delfs of Lansing, Mich., states that his motor fire apparatus is the greatest economizer

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it has been possible to find. "Where it used to cost us about $20 each month to keep horses for the department," says Mr. Delfs, "we are now operating the motor apparatus of three pieces and the chief's machine at a total cost of $17, or $3 less for the three than formerly paid for one horse. Under the old system every machine had at least two horses and the steamers three."

In his last annnual report, Fire Chief Delfs submitted the following figures showing a year's operation of a motor chemical:

Responded to fire alarms	186
Responded to practice and exhibition runs	3
Number of miles traveled to and from fires	301½
Number of miles traveled to practice and exhibitions	1½
Number of gallons of chemical discharged	5,690
Cost of maintenance: gasoline, cylinder oil, grease, spark plugs, etc	$37.78
Difference paid on tire replacement	$14.58
Or an average of 14½ cents per day.	
Total cost	$52.36

* * *

Fire Motor Economy in Trenton, N. J.

Trenton, N. J., has six motor fire wagons. The last annual statement of the Trenton fire chief showed some informing statistics from which the following particulars are taken:

ENGINE COMPANY NO. 2.

Engine, department test 700 gallons, two horses, requiring as a tender a combination wagon carrying 1,200 feet of hose, one 35-gallon chemical tank, 200 feet of one-inch hose and two extinguishers and engine equipment, drawn by two horses.

Value of engine and equipment and combination wagon and equipment	$8,896
Average life of horses	8 years
Average life of engine	20 years
Average life of wagon	12 years
Average life of harness	15 years
Cost to maintain from September 1, 1910, to September 1, 1911 (in service 84 times):	
Feed	$222.00
Hay	213.31
Horseshoeing	123.33
Peat moss	87.75
Soft coal	14.10
Harness repairs	1.25
Repairs and new parts	18.08
Apparatus fixings	....
Kerosene (lanterns)	6.25
Oil, waste, chamois, sponges, grease, etc	13.32
Time of superintendent repairs	6.00
Total	$705.51

The force consists of a captain, lieutenant, engineer, stoker, three hosemen, driver for the engine and driver for the combination wagon. The operation of this equipment requires:

Engineer	$1,300
Two drivers	2,200
Stoker	1,100
Total	$4,600

The following is a report of the motor wagon in use in No. 1 house:

ENGINE COMPANY NO. 1.

Motor pumping engine, department test 715 gallons, carrying its own supply, 1,000 feet of 2½-inch hose and full equipment. No depreciation after a year of service in cogs, pumps or motor. Tires still good. Value of engine and equipment, $8,000. Estimated life of apparatus, ten years.

Cost to maintain from September 1, 1910, to September 1, 1911 (in service 79 times); engine tested twice per day, fuel included going and coming and for pump power:

Gasoline, 76 tests, 18 gallons at 21c	$ 58.27
Tires and tubes	106.45
Motor oil	28.00
Grease, waste, chamois, polish, etc	5.85
Fittings, pipe lines (carburetor), bottom of pump and repair to gasolene pump	22.85
Repairing suction	1.80
Superintendent of machinery, time on fittings at 60c per hour	30.00
Total	$253.62
Number of men in company	7
To operate engine, one chauffeur	$1,100

Summary—The motor engine, with seven men, has six men on the pipe line. Steam engine, with nine men, has but six men on the pipe line, as one of the drivers takes care of the horses while at a fire. A saving is shown in the operation of the engines of $3,500 in favor of the motor apparatus. Saving in cost of maintenance shows $451.89 annually in favor of the motor apparatus.

A conclusion as to the replacement of the two classes of apparatus at the end of their usefulness would give the following:

Value of engine (steam), equipped to last 20 years	$ 8,898.00
Average maintenance for 20 years	14,110.20
Cost of overhaul end of 15 years	2,000.00
New horses at end of 8 years	1,200.00
New harness at end of 15 years	120.00
New hose wagon end of 12 years	1,400.00
Total	$27,728.20
Value of motor engine equipment to last 10 years	$ 8,000.00
Average maintenance for 10 years	2,536.20
Cost to overhaul end of 5 years	1,000.00
Total	$11,536.20

Approximately, three motor driven engines could be maintained for the cost of maintaining one steam engine.

* * *

Fire Motor Economy in Chattanooga, Tenn.

The motor fire engine of Chattanooga, Tenn., saves that city $898.01 each ten months, compared with horse apparatus, according to figures furnished by Chief William Toomey in his annual report. The detailed analysis, covering a period of ten months up to October 1 last, is as follows:

Motor engine for ten months—	
Gasoline, 503 gallons	$ 56.00
Cylinder oil, 66 gallons	39.60
Cup grease, 10 pounds	2.20
Charging batteries	5.25
Graphite grease	1.00
Tallow	1.00
Porcelains for spark plugs	3.60
Grinding compound	1.25
Coal oil, 30 gallons	2.55
Repairs	68.39
Repairs to tires	19.85
Towing car back to quarters	7.50
Freight and express on parts	12.40
Two new tire casings	199.50
Total for supplies used, repairs	$410.49
Steam engine for ten months—	
Feed for four horses	$340.00
Shoeing four horses	60.00
Twenty tons of coke, engine heater	80.00
Engine and cylinder oils	2.40
Coal oil, 60 gallons	5.10
Two tons engine coal	9.00
Repairs to apparatus	52.00
Harness, repairs and supplies	10.00
Total	$558.50

* * *

Fire Motor Economy in Portsmouth, Ohio.

Fire Chief John R. Lynn of Portsmouth, Ohio, reports a saving of $165 a month in the cost of maintenance and an increase of 100 per cent in efficiency by the use of a motor engine and chemical in place of horse-drawn apparatus. Between February and the last week of October, 1911, this machine answered 77 alarms. "Its service," says Mr. Lynn, "has been most satisfactory. It replaces an ordinary steam fire engine and hose equipment, which was transferred to a new station and which required the maintenance of five horses. One man less is required at the motor station,

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and gasoline for all purposes has cost less than fuel for keeping water in a steamer at the evaporative point in the other station. It should also be considered that this machine responds to twice as many calls and could, if necessary, be placed to a greater task than has been exacted. Approximately, the monthly saving has been as follows: One fireman, $65.00; feed, etc., $100.00; total of $165.00 per month. Minor items would show a further reduction, while the saving in labor to the men, and the advantage of cleanliness and sanitation are matters of vast importance. The success attained has been such that it would seem utter folly to install any future equipment which would necessitate the purchase of additional horses, and the results to date would indicate the certain wisdom of replacing all our other apparatus with motor equipments as speedily as it can be accomplished."

* * *

Fire Motors Effect Saving in Fire Stations.

These are a few instances taken at random. But they do not begin to exhaust the economic advantages of the motor. A very important point in favor of the motor is the tremendous saving it effects in reducing the number of fire stations. To give adequate fire protection with horse apparatus needs three times the number of stations that are required for motors, since the latter have at least three times the speed of horses, even in crowded city streets, and many times their radius. A new fire station costing, say, $25,000, is a serious item to a growing municipality, whereas $5,000 invested in motor apparatus would render that new station unnecessary. And the expenses do not end with the purchase price of new buildings. There is rent to pay, besides wages for attendants, telephone bills, and scores of other items, all of which are rendered unnecessary when the fire-fighting radius of existing stations is trebled by the installation of motor apparatus.

These are irrefutable arguments, and although we may love and admire the old-time fire horses, in this case sentiment must give way to business. The fire horse is obsolescent. In ten years he will be extinct. And in the transformation at least $75,000,000 will be needed for motor apparatus.

* * *

List of Towns Using Fire Motors.

Following is a list, by states, of the cities and towns which have, up to within a month ago, installed motor fire apparatus. It goes without saying that these are the "creme de la creme" of the live and up-to-date municipalities of the New World. If we have inadvertently missed out any from this list we will be glad to include in a future list any omissions that are brought to our notice.

ALABAMA—Anniston, Birmingham, Mobile, Selma, Tuscaloosa.

ARKANSAS—Little Rock, Ft. Smith, Texarkana.

CALIFORNIA—Alameda, Berkeley, Chico, Hanford, Long Beach, Los Angeles, Loveland, Napa, Oakland, Palo Alto, Pasadena, Piedmont, Pomona, Redding, Redlands, Riverside, Ross, Santa Barbara, San Bernardino, San Diego, San Francisco, Venice, Whittier, Willows.

COLORADO—Boulder, Colorado City, Colorado Springs, Denver, Grand Junction, Pueblo, Salida.

CONNECTICUT—Bridgeport, Branford, Bristol, Danbury, Greenwich, Hartford, Middletown, New Haven, Noroton, Norwalk, South Manchester, Stanford, Waterbury, West Haven.

DISTRICT OF COLUMBIA—Washington.

FLORIDA—Jacksonville, Sanford, Tampa, West Palm Beach.

GEORGIA—Americus, Atlanta, Dublin, Macon, Rome, Savannah, Valdosta.

IDAHO—Boise, Lewiston.

ILLINOIS—Aurora, Bloomington, Chicago, Danville, Decatur, Evanston, Rockford.

INDIANA—Decatur, Elkhart, Gary, La Porte, Mishawaka, South Bend, Vincennes.

IOWA—Cedar Rapids, Des Moines, Waterloo.

KANSAS—Atchison, Hutchison, Kansas City. Leavenworth, Manhattan, Wichita.

KENTUCKY—Lexington, Shelbyville.

LOUISIANA—Monroe, New Orleans, Shreveport.

MAINE—Lewiston, Portland, Westhaven.

MARYLAND—Annapolis, Baltimore, Catonsville, Hagerstown.

MASSACHUSETTS—Attleboro, Boston, Brockton, Brookline, Danvers, Fall River, Gloucester, Haverhill, Holyoke, Lawrence, Lenox, Lexington, Lowell, Lynn, Malden, Mansfield, New Bedford, Newton, Pittsfield, Quincy, Saugus, Somerville, Springfield, Swampscott, Waltham, Wakefield, Webster, Westfield, Winthrop, Worcester.

MICHIGAN—Battle Creek, Flint, Grand Rapids, Jackson, Lansing, Pontiac.

MINNESOTA—Minneapolis, St. Paul.

MISSOURI—Kansas City, St. Louis, Springfield, Webb City.

MONTANA—Billings, Bozeman, Great Falls, Missoula.

NEBRASKA—Lincoln, Omaha.

NEW HAMPSHIRE—Manchester, North Salem.

NEW JERSEY—Atlantic City, Bayonne, Burlington, Elizabeth, Englewood, Glen Ridge, Hackensack, Jersey City, Kearny, Long Branch, Morristown, Mercerville, Newark, Nutley, Passaic, Paterson, Park Ridge, Plainfield, Summit, Trenton, Vailsburg, Westfield, West Orange.

NEW YORK—Auburn, Binghamton, Herkimer, Hartsdale, Ithaca, Irving-on-Hudson, Jamestown, Malone, Middletown, Mt. Vernon, Newburgh, North Tarrytown, Olean, Peekskill, Port Chester, Poughkeepsie, Rochester, Saratoga Springs, Scotia, Schenectady, Tarrytown, West Chester, White Plains, Yonkers.

NORTH CAROLINA—Asheville, Durham.

OHIO—Akron, Alliance, Ashtabula, Barberton, Bellaire, Bucyrus, Dayton, Elyria, Hamilton, Lorain, Norwalk, Portsmouth, Shelby, Toledo, Warren, Youngstown, Zanesville.

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OKLAHOMA — Ardmore, Bartlesville, Guthrie, Muskogee, Shawnee, Tulsa.

OREGON—Astoria, Grants Pass, Portland.

PENNSYLVANIA—Butler, Braddock, Cynwyd, Forest City, Hatboro, Hazeltown, Hagerstown, Jenkinstown, Johnstown, Mahoning, Munhall, New Castle, Northampton, Oil City, Pittsburg, Pottsville, Reading, Scranton, Siegfried, Shenandoah, Wilkesbarre, Wilkinsburg, West York, Williamsport, York.

RHODE ISLAND—East Providence, Pawtucket, Valley Falls, Woonsocket.

SOUTH CAROLINA—Charleston, Columbia, Florence.

TENNESSEE—Chattanooga, Jackson, Memphis.

TEXAS—Amarillo, Austin, Beaumont, Dallas, El Paso, Ft. Worth, Galveston, Longview, Paris, Palestine, San Antonio, Texarkana, Terrell, Waco, Yoakum.

UTAH—Ogden, Salt Lake City.

VERMONT—Burlington, Montpelier.

VIRGINIA — Norfolk, Portsmouth, Richmond, Roanoke, Staunton, Winchester.

WASHINGTON—Centralia, Everett, North Yakima, Olympia, Seattle, Spokane, Tacoma, Walla Walla.

WEST VIRGINIA—Wheeling.

WISCONSIN—Beloit, Janesville, Racine, Superior.

Steel wheels are now being used on the motor buses of the London General Omnibus Company. The service was too severe on artillery type wooden wheels.

PHILADELPHIA SHOW.

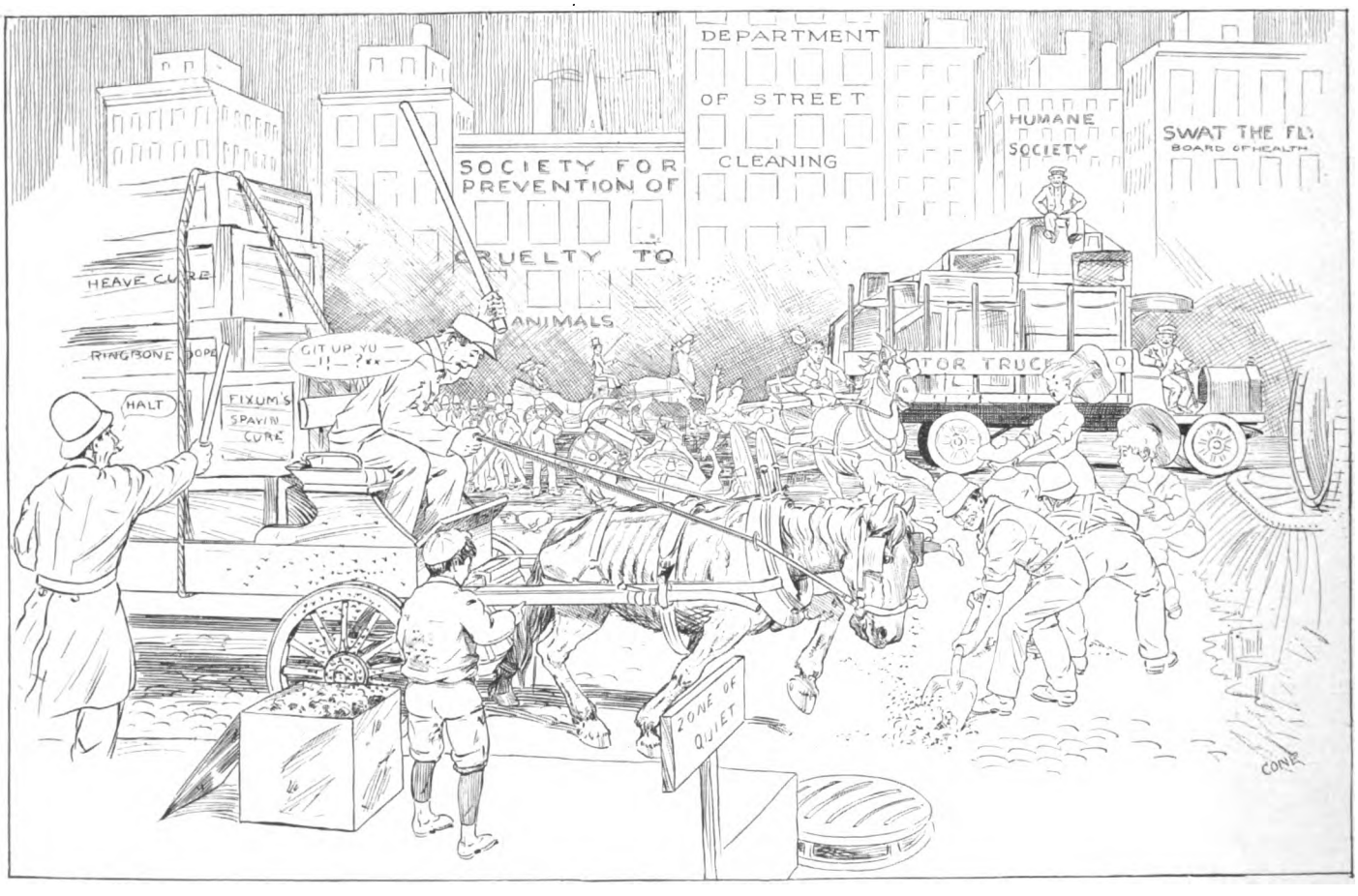
Motor wagons will be exhibited at both of Third Regiment Armory (Broad and Wharton streets) and the First Regiment Armory (Broad and Callowhill streets) during the second week—January 22 to 27—of the automobile show which will be held by the Automobile Trade Association in Philadelphia this month. Originally it was decided to confine the motor wagon exhibit to the downtown armory, but an unusual number of applications for space made necessary the use of the extra building. Motor fire apparatus will be made a feature of the show, as great expectations are held of the Philadelphia fire department to install motors in place of horses.

MOTOR WAGONS FOR FREIGHT SERVICE.

Advices from Etna, Siskiyou County, Cal., state that G. H. Rible, a representative of a motor wagon company of San Francisco, has been in Scott Valley investigating the advisability of establishing a motor wagon freight line operating from Montague and Yreka to Etna, Fort Jones and other points in the valley.

Rible is confident the line will be a paying enterprise, and expects to install the service about April 1. Two machines will be used on a daily service.

Less than 5 cents a day is stated to be the maintenance cost of the motor fire engine installed in Bozeman, Mont.



Street scene which will be notoriously obsolete when motor wagons are universally applied in place of the horse.

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A Veteran Fleet.

A Motor Wagon Installation that Is Doing Its Best to Rival "Tennyson's Brook."

HOW LONG does a motor wagon last in service before it depreciates to such an extent that it has to be scrapped Some write off their machines in four years, some in six, most people in eight years, and some have the temerity to put ten or even twelve years as the limit of useful life. Again, there are others who assert that motor wagons never wear out; that with good care and administration, and suitable repairs and replacements of certain parts (by no means the most expensive parts of the machine), the modern power wagon will last practically forever.

Negative evidence is forthcoming in support of this last contention, for up to date no one has ever brought forward a photograph of a junk pile of motor wagons. But direct positive support—which, after all, is the most convincing—is given to the statement by the records of fleets of veteran machines which are still capable of doing many more years of useful service. One of these fleets of hale and hearty old-timers is in Rochester, N. Y., where it is employed in one of the hardest kinds of business it is possible to imagine—general express service.

More than ten years ago the Adams Express Company placed 15 electric delivery wagons in service in Rochester, N. Y., and today all of the original machines are still doing duty without appreciable change in most of their standard equipment. This record of service is convincing evidence of the durability of the motor wagon, and the subsequent installation of wagons of a similar type by the same company in the cities of Buffalo, Syracuse, Utica and Albany is proof of the economy of motors over horse-drawn vehicles.

The installation in Rochester comprises 15 General Electric wagons each of 2,000 pounds capacity. They are designed for double-pinion drive and each is provided with an Exide battery of 28 cells. The body is of the conventional Adams Express type.

These electric wagons leave the garage at 7 o'clock in the morning, come back again at noon, leave at 1 o'clock and finally return for the day at 6 p. m. Thus each is in active service 70 hours per week. The average mileage per day for each vehicle on a single charge is 30 to 35 miles. For the longer runs to outlying points, the machines are given a slight boosting charge at noon, which enables them to negotiate the extra mileage successfully.

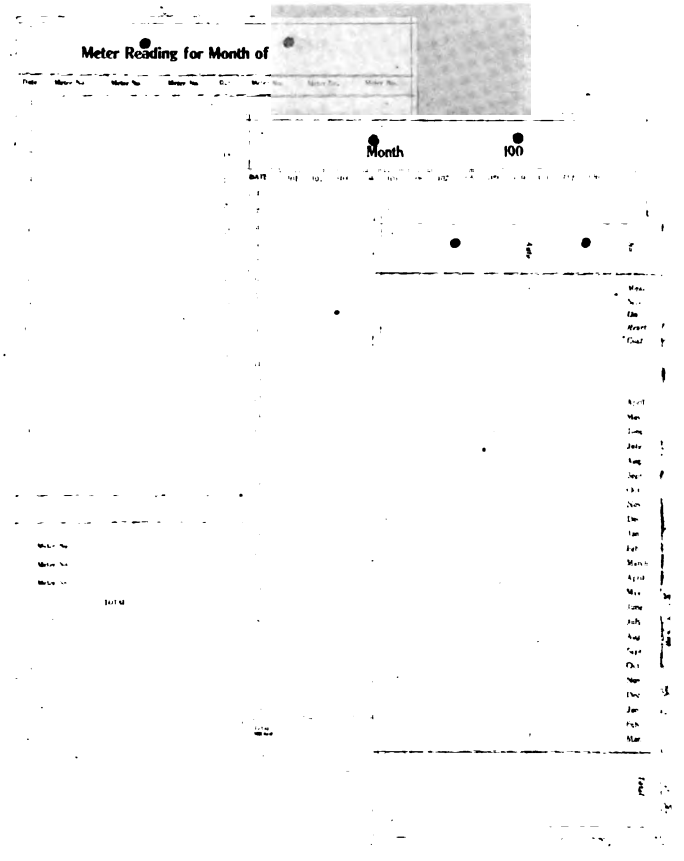
Located near the center of the business district is the company's garage, in which the vehicles are housed. This is a modern one-story fireproof brick building, 110 feet long by 62 feet wide. A brick partition divides this space into two sections, that fronting on the street containing the charging equipment, and the adjoining section the workshop and garage superintendent's office.

In the former is located the switchboard. Charging plugs are arranged at regular intervals around the walls. Current for lighting the garage and charging the vehicles is purchased from the Rochester Railway and Light Company, and as the garage is located in the latter company's direct-current area no converting apparatus is necessary.

In the workroom there are provided an oxy-acetylene welding outfit, a lead burning set, two lathes and the usual work benches. This apparatus is located along the sides of the room, the center space being utilized as a lounging room for the drivers.

Records are kept of the mileage and tire performance of each machine. The odometer readings are recorded on a special sheet. These sheets are taken each night by the garage superintendent when the drivers turn in their machines. At the end of the month the total mileage of each vehicle is found, also the total for the entire fleet. All records of the cost of renewals and repairs are kept in a special "repair" book. These records are forwarded each month to the main office of the company, where comparisons are made.

A standard tire record is kept for each vehicle over a period of one year. The make, size and cost of each tire is noted, together with the date of the machine is placed in service. The mileage and repairs are figured



Meter, odometer and tire record cards used by the Adams Express Company in connection with its fleet of 15 electric wagons at Rochester, N. Y.

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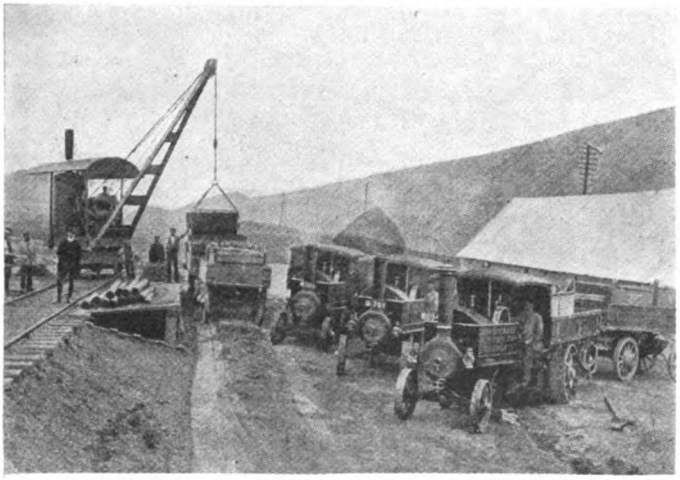
for each month. Meter readings are of course taken each day and recorded on another chart.

It is estimated by the garage superintendent that the total cost of operating each vehicle per month, exclusive of driver's salary, is $70 to $75. The salary of the drivers ranges from $12 to $21 per week. The cost of current per week per vehicle is approximately $10. All of the drivers, several of whom have been in the service of the company prior to the installation of motor wagons, are enthusiastic over the electrics. Particularly at this season of the year, when the increased business incident to the holiday season makes overtime work necessary, do the drivers appreciate the advantages of the power wagon over the horse-drawn vehicle. Altogether, the performance of this fine old fleet gives the lie to the accusations of short life made against the motor wagon by people who do not know.

"MACHINE" LOADING METHODS.

To obtain the fullest advantage of power wagon installations, it is necessary to adopt "machine" methods in loading and unloading, so as to keep the most valuable part of the equipment—the power wagons—working the greatest possible number of hours per day. The illustration shows the method used by one of the big English railroads in the loading of its fleet of steam motor wagons.



"Machine work" in motor wagon administration. A fleet of steam wagons in the service of an English railroad company, being loaded with a movable crane.

FRANCE REVIVES ANNUAL SHOW.

France has been forced to revive its annual automobile show in Paris—discontinued since 1908—in view of the threatened or actual supremacy of Great Britain which is focusing the attention of buyers to its brilliant automobile shows in London. The use of the Grand Palais has been secured for this purpose from October 5, 1912.

The splendid service of the motor buses in London is evidenced by the fact that 130 of the machines have covered 94,000 miles in a stated period, with only 9 involuntary stops.

MOTOR FREIGHTER IN OREGON.

A dispatch from Bend, Oregon, dated December 3, 1911, says:

"The success of the motor truck as a freight carrier in that portion of Central Oregon not yet penetrated by railroad was shown by the first trip from here to Burns and return by the Central Oregon Trucking Company's cars, which completed the round trip yesterday. The two big Packard machines made the 300 miles with a perfect score, the drivers declaring the road excellent.

"The cars left here Monday afternoon, arriving at the Harney County seat at 11 a. m. Wednesday. Their actual running time was 19 hours. One car carried 7,200 pounds of freight and the other 7,600. The biggest part of it was for Bill Hanley and was delivered to his ranch near Burns. Some Thanksgiving goods for Burns merchants also were taken through in time to be sold before the holiday.

"The return trip was made in 14 hours' actual running time.

"About as much freight was brought back as taken from here, consisting mostly of hides."

OCEAN-TO-OCEAN TEST FOR ARMY MOTORS.

The longest "hike" ever undertaken by troops of the United States army, from San Francisco to New York, probably will be arranged for the near future as a test of the marching ability of infantry and of the utility of the motor truck in place of animal drawn vehicles for army transportation under service conditions. This is the recommendation of Lieutenant Colonel George Bell, Jr., inspector of the maneuver division, embodied in the annual report of the inspector general to the secretary of war.

In order to get a fair estimate of what could be expected of infantry and a thorough demonstration of the auto truck, Lieutenant Colonel Bell suggests that an infantry company at war strength and with full field equipment be chosen to make a transcontinental march.

He advocates calling for volunteers from the infantry regiments of the service to be led by picked officers who have had exceptional experience.

INDIANAPOLIS BOOSTS LICENSE FEE.

The city council of Indianapolis has passed an ordinance increasing the license fees of motor vehicles. Already the license fee charged is discriminatory against motor wagons. Here is a chance for good organization among local motor wagon users and dealers to protest against this outrage.

The Detroit city commission has ordered the gear of its motor fire apparatus to be cut down from a maximum of 70 miles an hour to 40.

Motor wagons are being used to move $100,000 of rare plants from a Japanese 6-acre tea garden at Pasadena, to a new site at Oak Knoll, Cal.

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Motor Wagon on Farm.

Still Another Instance Which Explodes the Theory that the Motor Wagon is Only a Road Vehicle.

PRACTICAL USE of a heavy motor wagon is being made on the farms of Mrs. George H. Lewis and Alfred G. Lewis near Geneva, N. Y. The machine used is a 5 ton, worm-driven Pierce-Arrow. These farms comprise 1,050 acres, devoted to the sheep and dairy cattle interests.

Bellwood Farm, the property of Mrs. George H. Lewis, comprises 350 acres. The White Springs Farm, owned by Alfred G. Lewis, comprises 700 acres. The motor wagon is owned jointly by the farms and a ledger account is accurately kept of the tonnage.

The purchase of the machine came about in the following manner: In the spring of 1911, 80 acres were planted in peas for the canning factory at Geneva. The viners, or shellers, were located at the farm. At the time of harvest it took all the farm teams to haul the vines to the shellers, and the problem of getting the shelled peas, which are put into 60-pound baskets, to the factory in the least possible time was solved by the use of the 66 horsepower Pierce-Arrow touring car owned by Mr. Lewis. The body of the car was removed and a rack holding 52 baskets holding 60 pounds each was built on the chassis. The harvest of the peas lasted for 15 days. Shelled green peas must get to the factory without delay. The touring car solved the problem and the peas reached the factory in the best possible condition. An accurate account of the cost of transporting the peas demonstrated that a heavy motor wagon for farm work would be a paying investment and a great time saver.

The 5 ton Pierce-Arrow motor wagon was delivered on September 1, 1911, and the following classes of freight handled by the machine have clearly demonstrated its practicability and the reduced cost of transportation: lumber, cement, sand and gravel, brick, cherries, apples, wheat, straw, hay and feed of all kinds, manure to the different fields, cabbage, potatoes, cordwood, sheep and cattle to market, coal, baled shavings,

The converted touring car, which proved to a New York farmer the necessity for a motor wagon.

Motor wagon with load of cabbages, used on the White Springs Farm, near Geneva, N. Y.

and milk which is carried to a downtown dairy. The modern farm has a large variety of freight to handle, and this machine is certainly adapted for a wide range of usage. The motor wagon has also been used for filling silos and cutting corn stalks as well as hauling harrows on plowed ground. It has even been used for plowing.

From September 1 to December 1 the machine covered 1,538 miles, using 376 gallons of gasoline and hauling 1,316,620 pounds of freight. It will be seen from this that four miles is the average distance per gallon of gasoline. The fuel cost for 1,316,620 pounds of freight at 12 cents a gallon for gasoline amounts to $45.12. The following gives the total cost of operation for the above freight handled from September 1 to December 1, 1911:

Mileage	1,538
376 gallons of gasoline at 12 cents	$ 45.12
Time of men handling freight, and driver.	225.00
Insurance on motor wagon	24.00
Depreciation at 5 per cent	40.00
Oil and grease	6.00
Interest on investment at 6 per cent	48.00
Total	$388.12

This cost has been materially reduced, as a new man who had never driven a motor vehicle had to be taught how to operate the machine, and of necessity a good deal of time was wasted, as the truck was not loaded to full capacity until the man became fully competent in its management.

The motor wagon was put in operation at practically the end of the farm season. From April until September is the busiest time in farming. The machine on these farms makes it possible to keep the horses at their proper work and does the work of at least three teams. It hauls freight at much less cost than is possible with horses, but a greater factor even than this is the great amount of time saved. The farm work is better done;

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the crops are put in more promptly; and the harvest is much easier handled. In all road work to and from Geneva the motor wagon easily does the work of five teams, but Mr. Lewis is certain that in general average work on the farm the machine easily performs as much work as three teams.

There is no question as to the success of the power wagon on these New York farms.

FIRE MOTORS IN CHICAGO.

Chicago has already expended $40,000 for the purchase of motor fire apparatus. The outlook for the complete motorization of the fire department is very promising.

"If we had enough funds," said Fire Chief Seyferlich recently, "every horse in the fire service would give way to the motor. As it is, we have to put the machines in gradually—and perhaps it is just as well. But I feel certain that in the years to come the fire wagon 'bangity-banging' down the street behind a trio of galloping horses will be a sight remembered only by grandparents. The motor apparatus as a fire engine is so much superior to the old-fashioned wagon and horses that there is but one side to the question. In every instance, in every detail, the gasoline-driven wagons have shown themselves as more economical, safer and more efficient than the other.

"We are now contemplating the purchase of a motor steam engine, a motor pumping engine and a motor hook and ladder cart. The motor steam engine will cost $11,500. I believe it to be practical and a saving. The same with the other cars. Besides the 13 gasoline fire engines now employed, the fire department has five individual cars. From my experience with the automobile I can give a dozen arguments in favor of it and can think of none against it.

"In the first place, it is faster. Speed is the measure by which the efficiency of the fire department is judged. The motor driven engines go from 20 to 30 miles an hour answering a call. The horse teams can not make this speed.

"When the alarm first reaches the engine house a number of the most precious moments in fire-fighting are consumed harnessing up the horses. The motor engine, kept in fine condition during the leisure hours by the firemen, is ready on the first tinkle of the fire bell. Not an instant is lost. It is very much easier to control the machines than it is the horses. I don't believe there is a fireman working for the city who couldn't learn to drive a motor engine to a fire at top-notch speed. To drive a three-horse team of fire horses takes knack, nerve and experience. Even with these qualifications, it is a difficult task. The horses rear, shy and are liable to stumble. A motor kept in running condition, overhauled every day, will never break down on a run. It is safer to handle, safer to the public, not so noisy and by its superior speed it increases the efficiency of the department 50 per cent.

"The keynote of the fire department is efficiency. Expense does not figure, that is theoretically, as it does in a private organization. The object is to give the public the best and most instantaneous service. There is no question in anyone's mind that the gasoline engine enables the department to do this far better than the horse. I think that even the city council is aware of this. But arguing the thing from a business standpoint, the motor in time, is a better financial investment than the horse. The motor's strong points are speed and control. Those are the very things that the fire department demands of its transportation factors. The motor is no more expensive than the horse. Horses run down. A horse has to be in his prime to be a fire horse. They don't last very long. It is hard for a fireman to think of 'what it costs' when he sees that the device or whatever you want to call it, is for the betterment of his department.

"I have looked over a stack of figures submitted both by the manufacturers of the machines and by people who have made use of them. These figures have convinced me that the project is an economical one. In fact there is no great need to argue this because there is no one, to my knowledge, who denies it.

"The council is so beset with means of expenditures that when they ask me how much I'll need for the year, I get nervous at the thought of all the money I really need to make the department what it ought to be. I name a comparatively small figure. And I don't get all of that. So if there are not as many motor engines in my department as my enthusiasm would warrant, it is not my fault.

"Companies 3, 5, 7, 51, 70 and 107 have motor fire engines. They have been running for some time. They have been put to actual test, run to fires and each time they have shown themselves vastly ahead of the horses in everything. When we first put them in, I remember the forecasts that went up. I was pretty apprehensive myself.

"There have been no accidents. Yes, if the city council would give me the money I would remove every horse in the department and put in the motors. Some time someone will be able to do what I say I would like to do. The result will be apparent from the first day. The motor fire engines we are using are made right here in Chicago. They cost all the way from $2,000 to $5,000 apiece. On the average, a team of fire horses costs $1,000, and a chemical or hose wagon about an equal amount. I can see no other side to the argument or question, or whatever you call it. The motor is better and I am sure more saving than the horse. Then, why not use them, eh? Go ask the city council. I've been asking that same question for some time."

Electric motor wagons made a good showing at the Los Angeles Electrical Exposition, held November 25 to December 9, last.

London's motor cabs cover from 60 to 80 miles a day each, earning a daily minimum of $8.

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Special Motor Ambulance.

A Machine Which Has Removable Linings and Is Designed for Contagious Disease Hospitals.

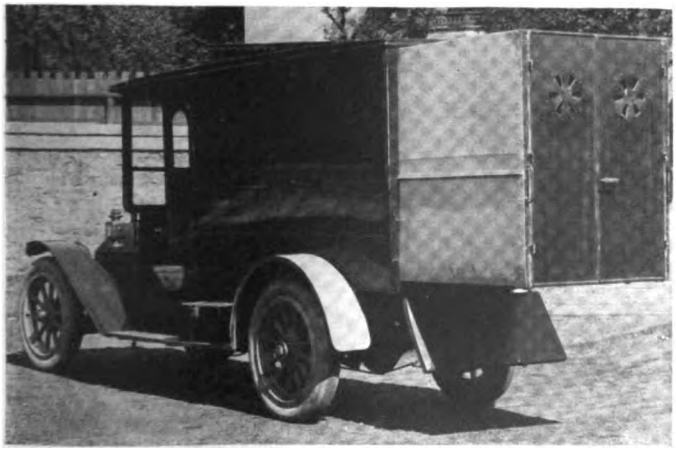
IT IS A compliment to the motor wagon that the inventor of the first ambulance designed on modern hygienic lines for the transportation of persons afflicted with contagious diseases should have chosen this type of vehicle as best suited to his purpose.

The machine illustrated herewith is unique of its kind. It was devised by Dr. Walter S. Goodale, superintendent of the Ernest Wende Hospital (for contagious diseases), Buffalo, N. Y. Patents have been applied for to cover the main features of the invention.

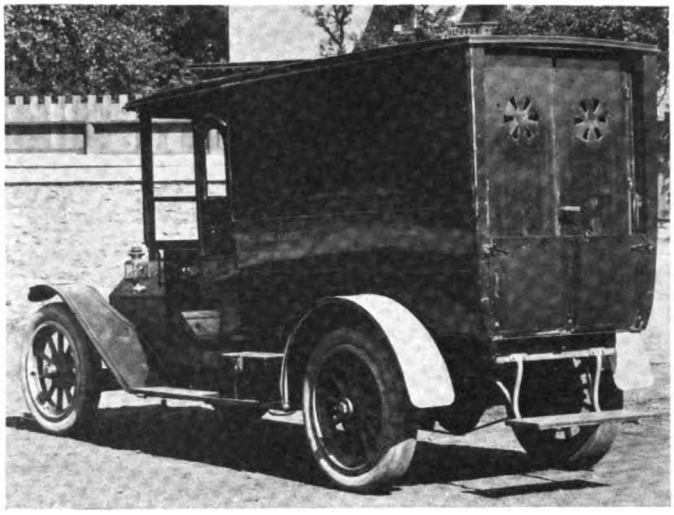
This device was designed primarily for hospitals handling contagious diseases exclusively. Every institution of this sort is confronted with the problem of transporting persons without the loss of time incidental to ordinary methods of disinfection. Many different patients, each suffering from a different disease, are received daily. Manifestly, it would be absurd to maintain an ambulance for each disease. In this instance, the inventor has succeeded in blending the scientific with the practical, for a hospital with one ambulance can provide itself with five linings, each one fitting the vehicle, the result being practically five different ambulances.

The Ernest Wende Hospital has an equipment of this sort, with one lining for scarlet fever, one for diphtheria, one for measles, one for smallpox and one special lining for suspected cases or other diseases not mentioned. This institution stores them in five metal air-tight compartments built on a semi-circular platform placed on the edge of the garage turntable. Linings so housed can either be disinfected in the ambulance, as all openings are made to shut tight, or they can be removed from the vehicle, placed on the ground and washed with soap and water; or else they may be fumigated while in their storage compartments within the garage. Two men can exchange an infected lining for a clean one in five minutes.

These linings can be made to fit any ambulance body and ought to be used by "general" as well as "contagious" hospitals, because the former often are called upon to transport patients supposed to be suffering with some simple malady, who upon examination prove to be afflicted with some dangerous and infectious disease.



Lining partly withdrawn.



Motor ambulance with lining in place.

This motor ambulance body measures 6 feet 8 inches by 5 feet by 3 feet, and weighs 300 pounds. The interior is built with aluminum on the sides and roof, all joints being tight and well soldered. The floor is of matched white wood covered with galvanized iron.

There are two flanges of 7/8-inch angle steel running lengthwise, one on each side of the outside of the lining, well riveted to the frame and so located as to enter grooves made for their reception on the inside of the ambulance body. This device prevents the lining from jostling about while the ambulance is in motion.

In the rear are two full-sized aluminum doors, each hung on three hinges. The left door is made stationary by two bolts on the inside, top and bottom, both operated with rod and lever, also on the inside. The right door has a handle located on the outside and set to operate a No. 16 improved undertaker's wagon lock.

The accessories include: one dome light; four 9-inch ventilators, two front and two rear; speaking tube; folding wooden seat attached to inside of lining near rear door; regulation all-metal ambulance bed of the box spring type; one U. S. hospital and army stretcher, litter type.

A register opening in the bottom of the lining is made to connect with the engine exhaust for heating purposes, when desired.

The bottom of the lining is equipped with 12 ball bearing wheels, arranged in four sets of three each, to facilitate moving the lining.

Depreciation of motor cabs in London is based on a life of seven years.

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The Palace Show.

List of Exhibitors and Their Models. Details of Design of These and Other Machines Are Fully Given in the Specification Tables in This Issue.

UNUSUAL efforts have been put forth to make an industrial success of the motor wagon exhibition to be held at the Grand Central Palace in New York from January 10 to 17. Many thousands of invitations have been extended to representatives of concerns which are either now possessed of machines or are believed to be preparing to purchase them. The liberality of expenditure in this direction will undoubtedly prove profitable for the 39 exhibitors, although, from the fact that motor wagons are to be put on display in conjunction with passenger cars, it will be difficult to determine how much of the "gate" will represent industrial interest and how much social interest. As three days of the "Palace" exhibition will be overlapped by the "Garden" exhibition, it is to be expected that visitors to one show will, during this period, be attracted to the models at the other, and thus part of the purchasing strength of one will be shared by the other.

For many reasons this is a fortunate condition. Certainly it is much better than the state of affairs it supersedes, namely, the holding of two shows in succession whereby the visitors to one were either unable or reluctant to attend the other. Split exhibitions have not helped the industry in the past. Meager representation at shows, too, has hurt it. Indeed this is the defect of the "Palace" and "Garden" shows—neither is wholly representative of the industry. Hence the Chicago show, which affords a common meeting ground for all factors in the industry, is generally regarded as the most useful function of its kind in the year.

The exhibitors at the "Palace" show will be as follows:

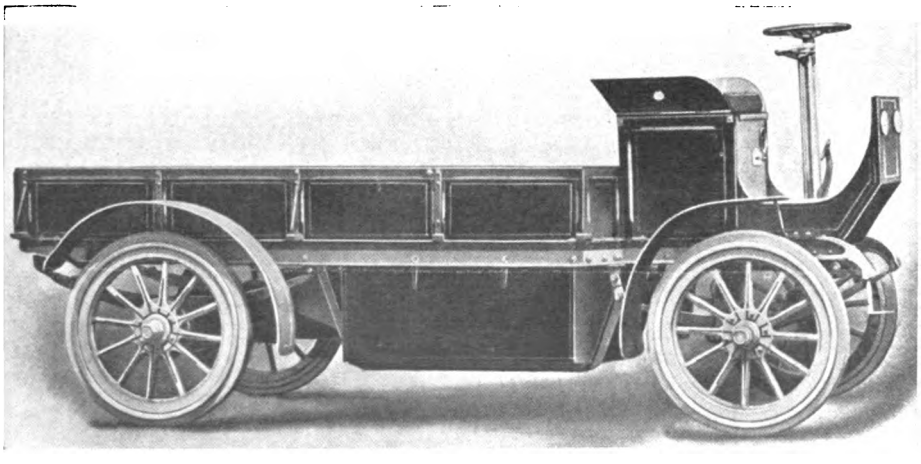
Argo Electric Vehicle Co.
Atlantic Motor Truck Co.
Atterbury Motor Car Co.
Bowling Green Motor Car Co.
Bushnell Press Co., C. H.
Chase Motor Truck Co.
Cortland Motor Wagon Co.
Dart Mfg. Co.
Dayton Auto Truck Co.
Decatur Motor Car Co.
Durant-Dort Carriage Co.
Eclipse Truck Co.
Federal Motor Truck Co.
Gramm Motor Truck Co.
Haberer & Co.
Herreshoff Motor Co.
Jeffery Co., Thos. B.
Knox Automobile Co.
Knickerbocker Motor Truck Co.
Lauth-Juergens Motor Car Co.
Lippard-Stewart Motor Car Co.
Marathon Motor Works.
Motor Wagon Co.
Newark Auto Mfg. Co.
Packers Motor Truck Co.
Progress Development Co.
Sanford-Herbert Co.
Schacht Motor Car Co.
Schlotterback Mfg. Co., L. E.
Standard Electric Car Co.
Stuyvesant Motor Car Co.
Sullivan Motor Car Co.
Universal Motor Truck Co.
Vandwater & Co., Ltd.
Veerac Sales Co.
Velie Motor Vehicle Co.
Walker Motor Vehicle Co.
Walter Motor Truck Co.
Wyckoff, Church & Partridge, Inc.

A brief description of the products to be placed on exhibition is herewith presented:

Argo Elec. Vehicle Co., Saginaw, Mich.

This concern makes electric motor wagons of 1,000 and 2,000 pounds capacity. A description of these models was given in the December, 1911, issue of the "Power Wagon."

Details of design are fully given in the specification tables in this issue.



Argo electric wagon.

Atlantic Motor Truck Co., N. Y. City.

This concern up to the conclusion of 1911, was the Eastern representative of the Rassel Motor Car Company, of Toledo, Ohio. The company expects this year to manufacture a complete line of gasoline motor wagons, from 1,500 pounds to 5 tons capacity.

* * *

Atterbury Motor Car Co., Buffalo.

This concern makes gasoline motor wagons of load ratings as follows: 1,500 pounds, 1 ton, 2 tons, and 3 tons.

Details of design are fully given in the specification tables in this issue.

* * *

Bowling Green M. C. Co., Bowling Green, O.

This concern manufactures several models of gasoline motor wagons, of 1,500 pounds' capacity, and bodies to suit. Both shaft and chain drive models are made.

Details of design are fully given in the specification tables in this issue.

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G. H. Bushnell Press Co., Thompsonville, Conn.

This concern makes the Maxim tricar. The motor is double cylinder, 3¼ x 4 inches, with special air cooled system. Other details are: Liquid transmission; chain drive; steel, bridge construction frame; artillery wheels, 28 x 2½ inches; base, 96 inches; tread, 49 inches; semi-elliptic springs; size of van, 39 x 36 x 28¾ inches; capacity, 500 pounds and driver; weight, 700 pounds; F. O. B. factory price, $395.

* * *

Chase Motor Truck Co., Syracuse, N. Y.

This concern makes gasoline motor wagons. The latest addition to the Chase line is a 3,000-pound machine with an express body. Other Chase models are of 1,500, 2,000 and 4,000 pounds' capacity. Various standard types of body are made.

The special feature claimed for these machines is accessibility of all working parts.

The motor is inclosed in a steel case which furnishes perfect protection from mud and water. The transmission gearing is also inclosed in a tight metal case which keeps out dirt, dust and moisture and allows it to run in a bath of oil. This greatly lengthens the life of these parts. The oil passes from these parts through the jackshaft case and lubricates the differential and jackshaft bearings.

The roller chain drive to both rear wheels is positive in its action and allows the gear ratio to be changed to meet road conditions.

Details of design are fully given in the specification tables in this issue.

* * *

Cortland Motor Wagon Co., Pittsfield, Mass.

This concern manufactures a 1,500-pound light delivery gasoline motor wagon, and will also make a 2,000-pound model in 1912

* * *

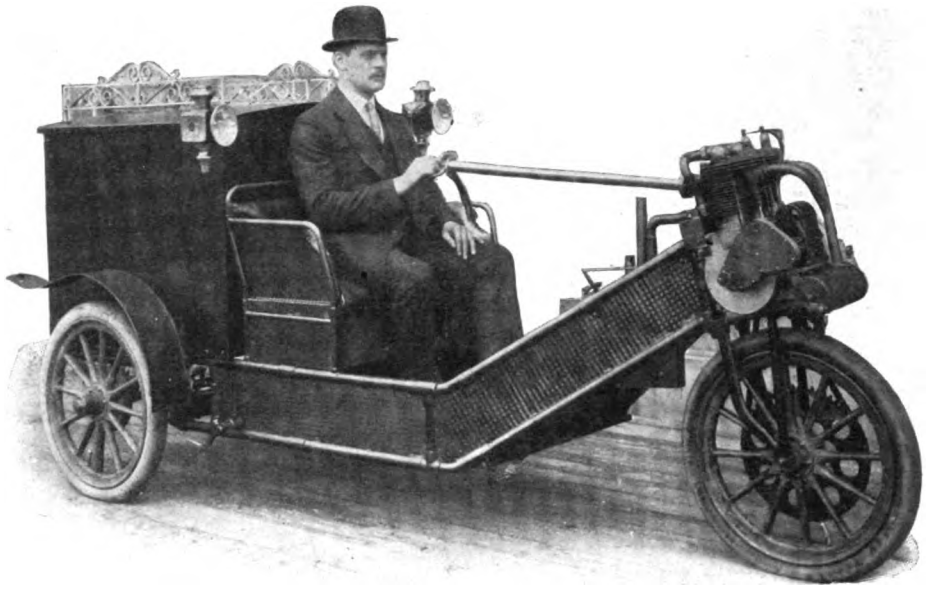
Dart Mfg. Co., Waterloo, Ia.

This concern makes a light gasoline delivery wagon, with open or closed body. At the time of going to press there was no picture available of the 1912 models, that given here being last year's machine. Improvements for 1912 on this model include the use of a heavier steering column, with an irreversible gear, a 16-inch wheel, and a larger brass tube than formerly used. It is also expected that the new models will be equipped with 2-inch side-wire tires instead of those now in use. Besides this, the efficiency of the motor, transmission, and jackshaft have been improved, by giving special attention to the machining and assembling.

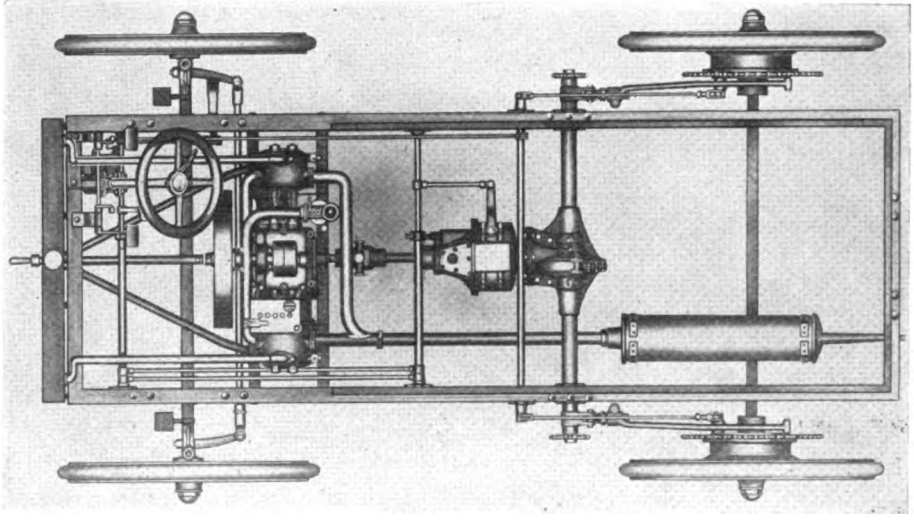
* * *

Dayton Auto Truck Co., Dayton, Ohio.

This concern specializes in the manufacture of the heavier varieties of motor wagon. Models of 1½, 3 and 5 tons' capacity are made, the first and last being recent productions. Long stroke motor, left hand drive, right hand control, large loading area with minimum body overhang, and the supporting of motor and radiator on independent frames—these are the outstanding features of the Dayton models which were



G. H. Bushnell Press Company's tricar.



Cortland chassis.

Chase Model D with panel top.

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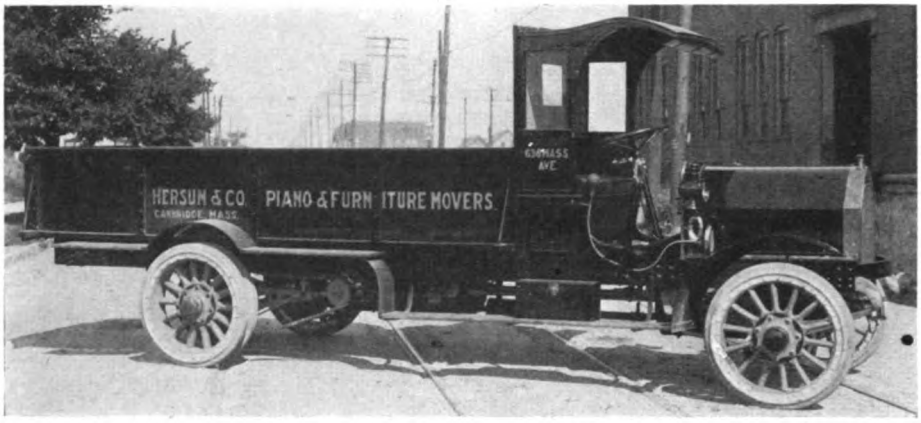
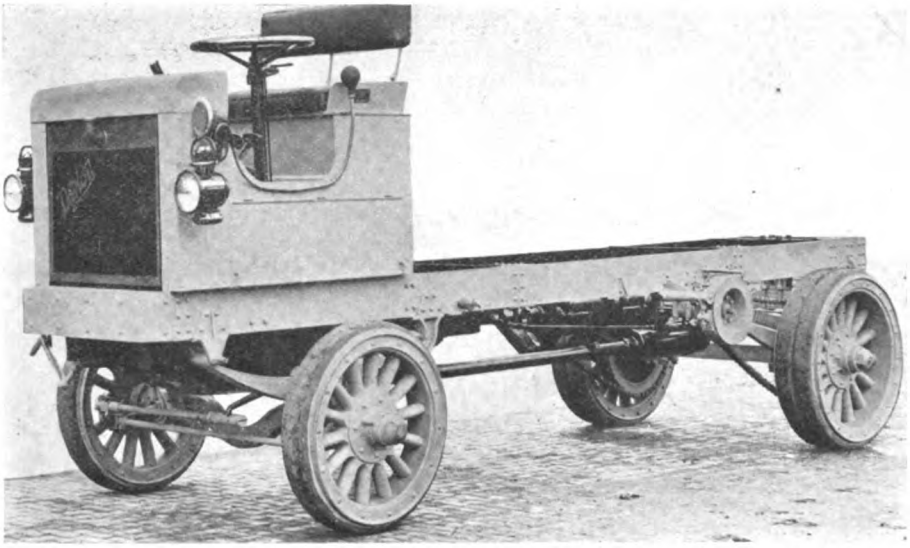


Atterbury motor wagon.



Dayton's latest—the 5-ton model.

Decatur power wagon.

designed primarily and exclusively as motor wagons, not as pleasure cars more or less converted.

Details of design are fully given in the specification tables in this issue.

* * *

Decatur Motor Car Co., Decatur, Ind.

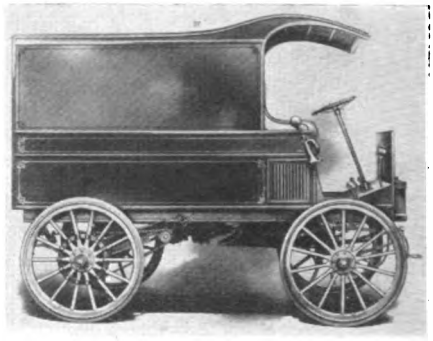
This company makes the "Decatur Hoosier Limited" 1½-ton motor wagon. Pneumatic tires are used on this model, single in front and dual in rear. Radiator troubles are eliminated by mounting this part of the equipment on the dash and suspending it by springs on either side. The dash, radiator, control and foot levers, gasoline tank and aluminum foot boards comprise a single unit, which is secured to the frame by four bolts. The seat may also be removed by taking out four bolts. The motor is made completely accessible by removing the side panel and foot boards, and swinging open the radiator. The radius rod construction gives full universal action under any load or road condition. All parts are readily accessible.

Details of design are fully given in the specification tables in this issue.

* * *

Durant-Dort Carriage Co., Flint, Mich.

This concern makes a gasoline motor wagon of 800 pounds' capacity, with a 2-cylinder, double-opposed motor of 4½-inch bore and stroke, placed under the floor board in front of the driver's seat. The speed is governor-controlled to 18 miles an hour. Friction transmission is used. The radiator is spring-suspended.



Cortland motor wagon.

Federal Motor Truck Co., Detroit.

This company specializes in 1-ton gasoline motor wagons, guaranteed against defective material and workmanship for 1 year. Several kinds of bodies are supplied, including express, stake and wire screen types.

Details of design are fully given in the specifications in this issue.

* * *

Gramm Motor Truck Co., Lima, Ohio.

This company manufactures gasoline motor wagons in 1, 2, 3 and 5-ton models. The special features of these machines, according to the makers, are "the Gramm type of roller spring suspension, the three-point suspension of the motor and transmission; the flexible construction of the frame; the support of the radiator upon

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coiled springs, eliminating vibration; multiple disk clutch; vertical four-cylinder motor of ample size; selective transmission, four speeds forward on the 3 and 5-ton models; the use of Timken bearings wherever they are adaptable; and finally the use of nothing but the highest grade of material obtainable."

Details of design are fully given in the specification tables in this issue.

* * *

Haberer & Co., Cincinnati.

This concern is making a light gasoline delivery wagon. No details are to hand concerning the design of the 1912 model.

* * *

Herreshoff Motor Co., Detroit.

This concern makes a gasoline light delivery wagon, which is Model 25 of the company's line of motor vehicle chasses. According to the company's announcement it is "the result of replacing the three passenger runabout body by the Herreshoff delivery body. Either body is readily detachable from the chassis by loosening four bolts with wing nuts. With proper equipment the change can be made in 20 minutes. Small storekeepers and others can combine their equipment for pleasure and business purposes by the purchase of a Model 25 runabout, and an additional delivery body. The change from one body to another is quickly accomplished."

Details of design are fully given in the specification tables in this issue.

* * *

Hupp Corporation, Detroit.

This concern has just entered the motor wagon field with a 1,000-pound model electric machine. Details will be given later.

* * *

Thos. B. Jeffery Co., Kenosha, Wis.

This concern specializes in municipal motor wagons, including fire apparatus, police patrols, ambulances, etc.

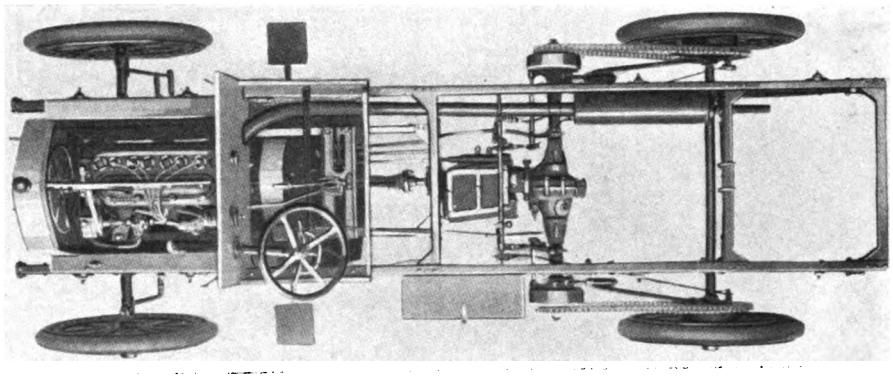
* * *

Kelly Motor Truck Co., Springfield, O.

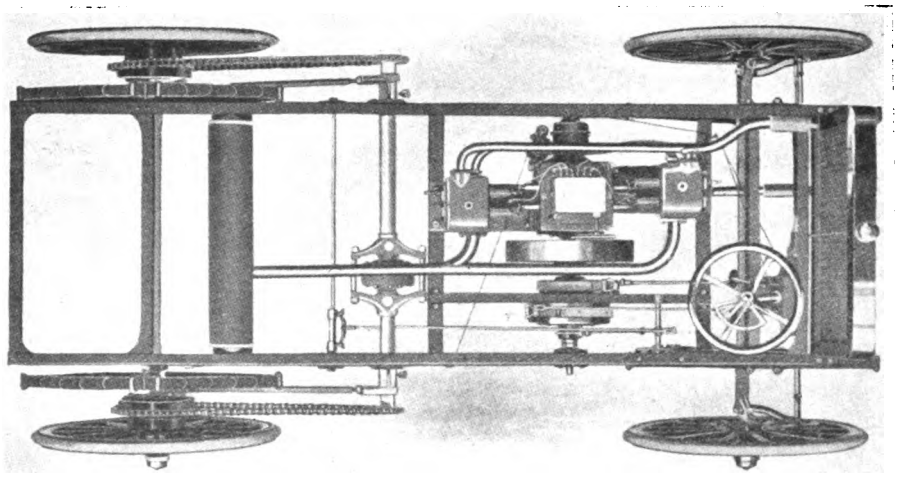
This concern makes 1-ton, 2-ton and 3-ton gasoline motor wagons, including the new 1-ton model.

According to the manufacturers "There are 200 operations in the production of a Kelly truck, in which the limit of error is held to 1-1,000 of an inch; 20 operations in which the limit of error is betwen 1-1,000 and 1-2,000 of an inch; and 30 operations in which the limit of inaccuarcy is 1-4,000 of an inch. To the layman, unaccoustomed to the tools and gauges used in this work, such measurements do not sem possible—nor do they sem necessary. Yet it is just such microscopic points as this that make the great difference in motor trucks' operating costs. To attain such results it is necessary to have special jigs, fixtures, and gauges for every machine operation on the car.

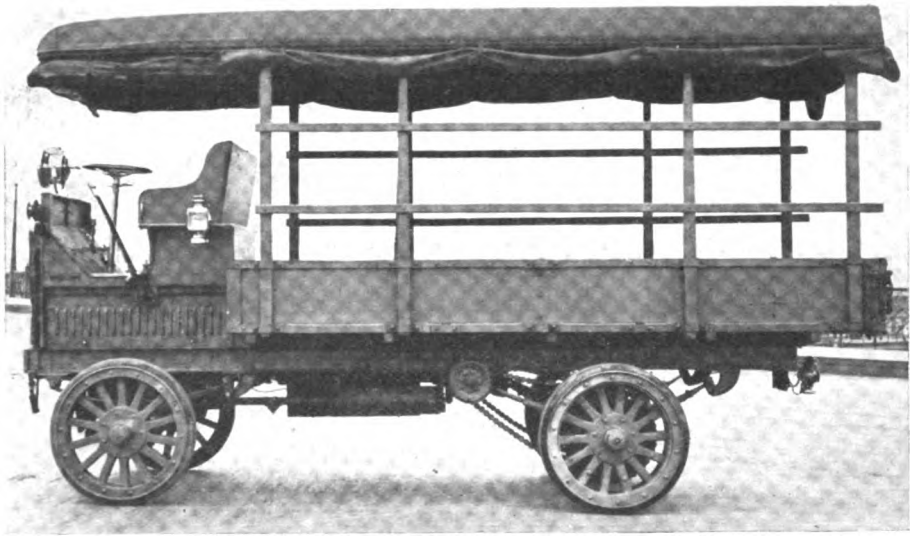
"With the exception of the spring clip where compression of the springs will vary a little, every cotter hole in every



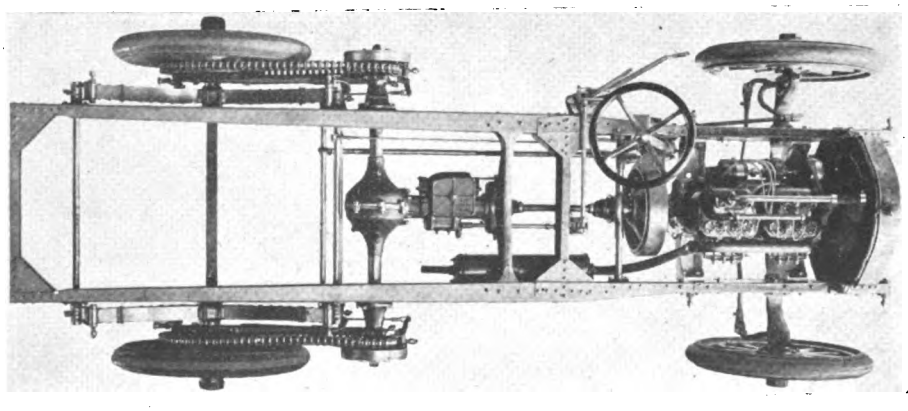
Bowling Green chassis Model A.



Chassis of the Dart light delivery wagon.



Knickerbocker power wagon.



Federal chassis.

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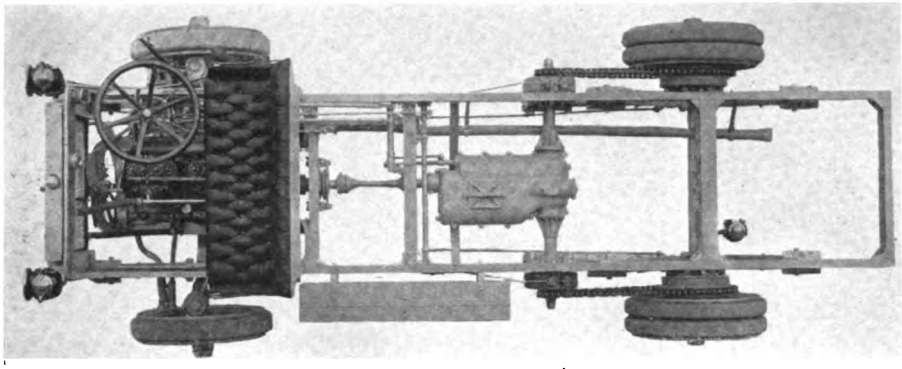
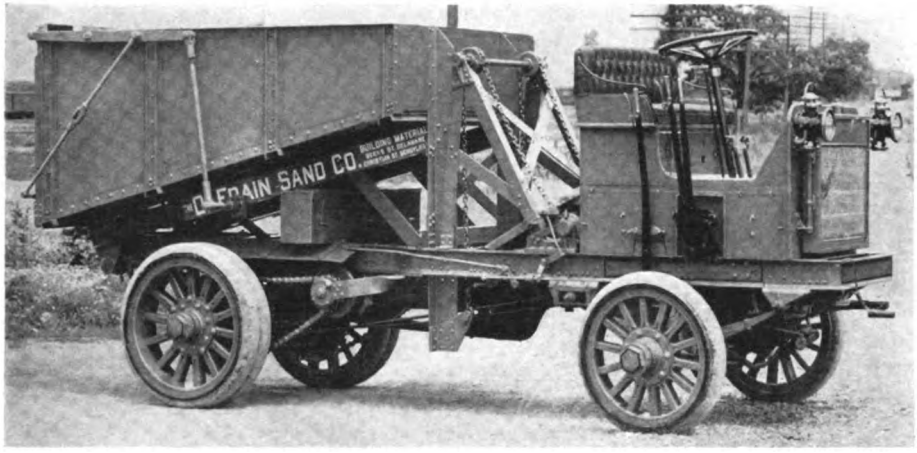
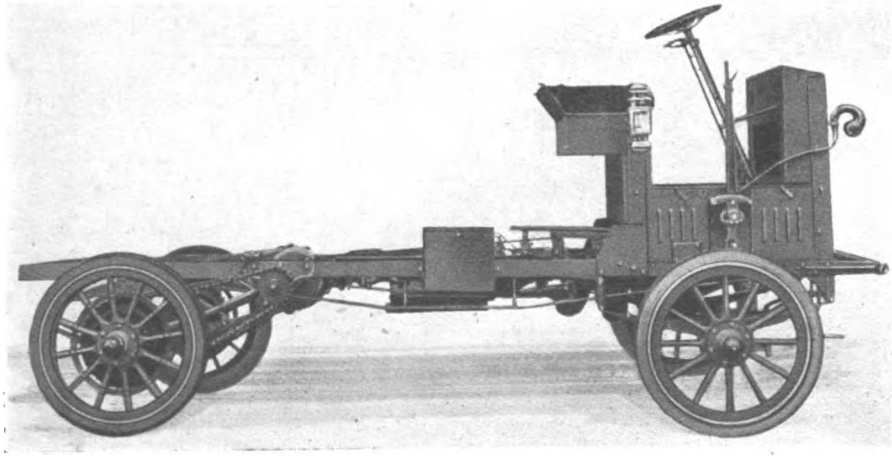


Gramm 3-ton chassis.



Gramm 5-ton power wagon with special sand dumping body.

Kelly 1-ton motor wagon.



Lauth-Juergens 1-ton, 2-cylinder chassis.

bolt on the Kelly truck is drilled on a jig before it goes to an assembly floor. The sound of a file, chisel, drill, or emery cloth is seldom heard on any erecting floor in the Kelly factory. This means not only added life, reduced friction, and, therefore, reduced wear, but it also means that if at any time it is necessary to order a repair part this part will fit into place perfectly without adjustment."

Details of design are fully given in the specification tables in this issue.

* * *

Knickerbocker Motor Truck Mfg. Co., N. Y.

This concern makes a 3½-ton gasoline motor wagon, with the motor suspended on a hickory subframe. The motor is made to slide in and out on this subframe, just as one would slide a drawer out of a desk. The same construction is used for the clutch and transmission. Springs are made of silico manganese steel, costing 20 cents a pound. A supplementary coil spring is placed directly over the axle and under the frame so as to carry the maximum load at the strongest point. This comes into action only when the motor wagon is loaded to 50 per cent of its regular carrying capacity.

Details of design are fully given in the specification tables in this issue.

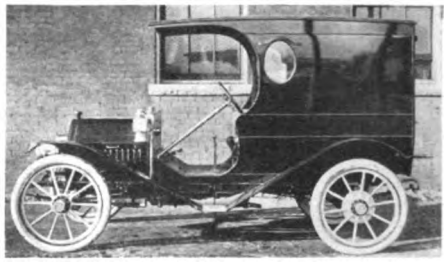
* * *

Lauth-Juergens Motor Car Co., Fremont, O.

This concern makes a line of 1-ton, 2-ton and 3-ton gasoline motor wagons, and 5, 6 and 1-ton machines to special order.

Details of design are fully given in the specifications tables in this issue.

For further particulars, see the "Power Wagon" for December, 1911, pages 84 to 86:



Herreshoff motor wagon.

Lippard-Stewart Motor Car Co., Buffalo.

This company has recently begun the manufacture of motor wagons, and is specializing on a 1,500-pound gasoline model with various types of bodies, including inclosed panel body, express body with top, open box body, platform stake body, police patrol body, ambulance body and hotel omnibus body. Machines are guaranteed for one year.

The company is now manufacturing in the plant formerly occupied by the Thomas Taxicab Company. According to the makers, the design of the Lippard-Stewart shaft drive gasoline delivery wagon "will appeal alike to engineers, driver and garage men, on account of the simplicity and accessibility of all parts. R. G. Stewart, the designer, formerly of

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the Franklin Automobile Company, has been unusually successful in designing his chassis so that every unit—motor, steering gear, transmission, clutch, radiator, axles, etc.—is easily and quickly removable without disturbing any other unit or the load. Simplicity has been secured by the elimination of many parts. Mr Stewart has been able to do away with batteries, time coil, water pump and connections, belt-driven fan, subframe and many other parts heretofore considered essential."

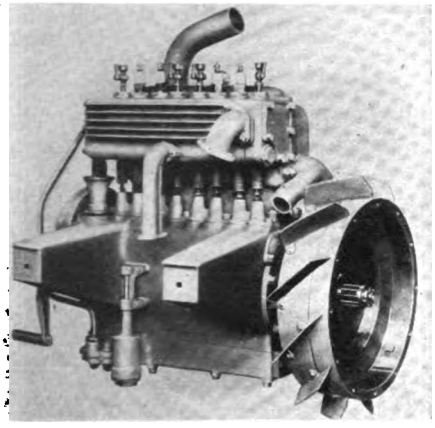
Details of design are fully given in the specification tables in this issue.

* * *

Motor Wagon Co., Detroit.

This concern specializes on an 800-pound gasoline wagon with bodies as follows: Open express, stake and full panel, of various sizes.

Details of design are fully given in the specification tables in this issue.



Lippard Stewart motor with suction fan on flywheel.

Sanford-Herbert Co., Syracuse, N. Y.

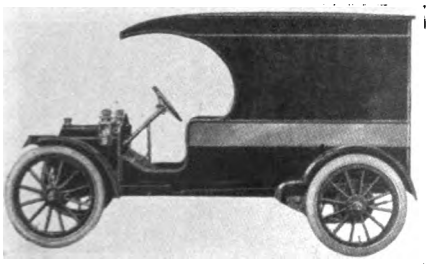
This company makes the "Sanbert" gasoline motor wagon, 2,000 pounds capacity. All parts are standardized and interchangeable. The machines are warranted for 90 days, excepting tires, rims and chains, which are not guaranteed.

Details of design are fully given in the specification tables in this issue.

* * *

Schacht Motor Car Co., Cincinnati.

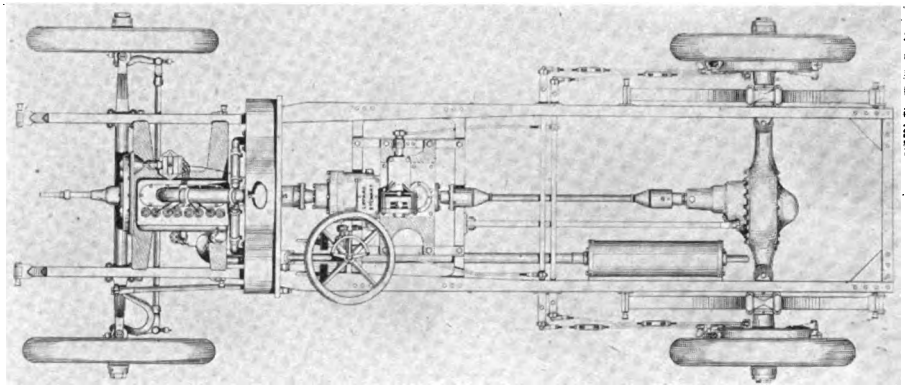
This company specializes in heavy duty gasoline motor wagons, of 2, 3 and 4-ton rated capacities. Bodies, which



Motor Wagon Co. of Detroit.

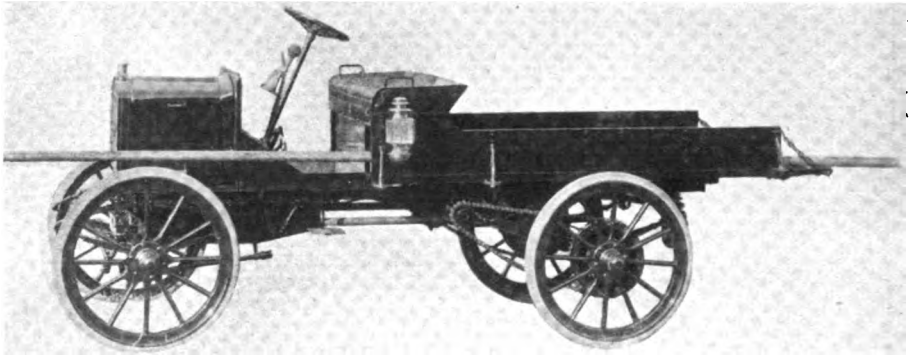
are optional, include open, stake and omnibus types.

The Schacht company also makes a 1,-

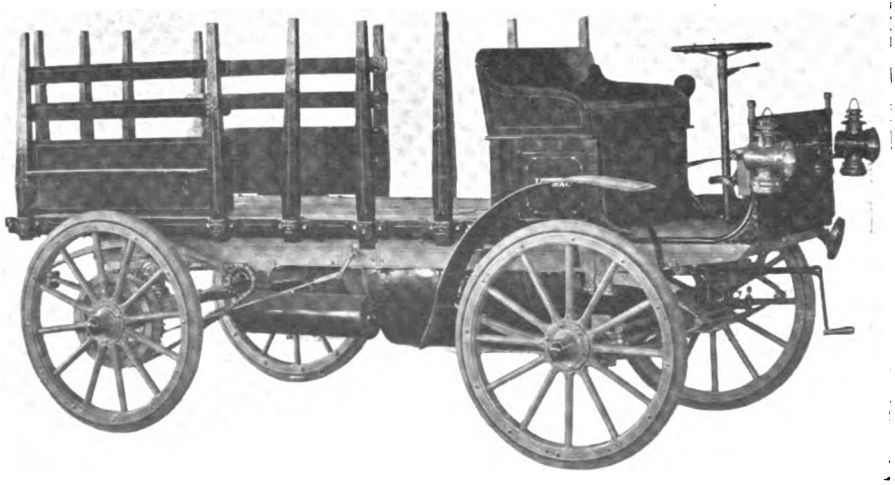


Lippard Stewart chassis.

Schacht motor wagon.



Sullivan 1,500-pound special plumber's machine.



Veerac motor wagon.

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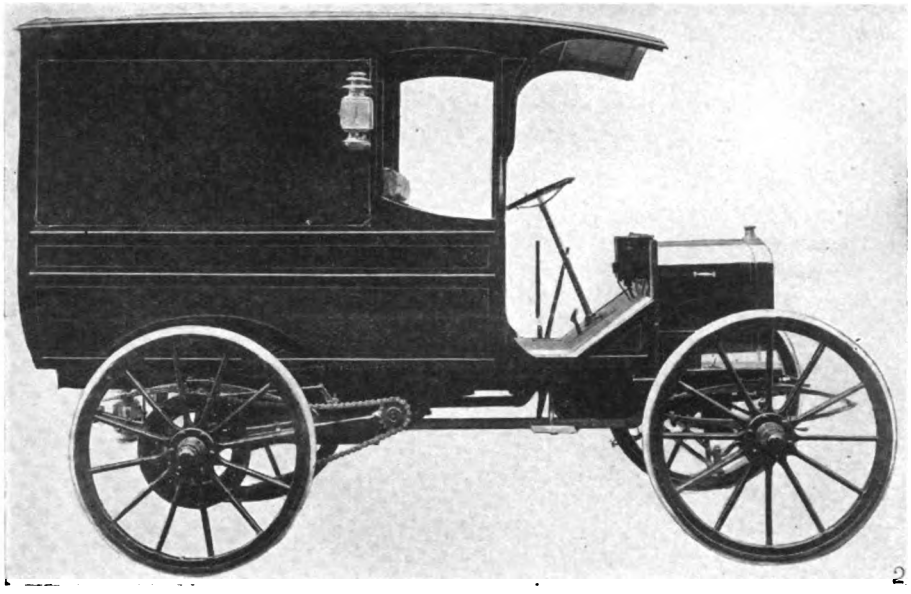
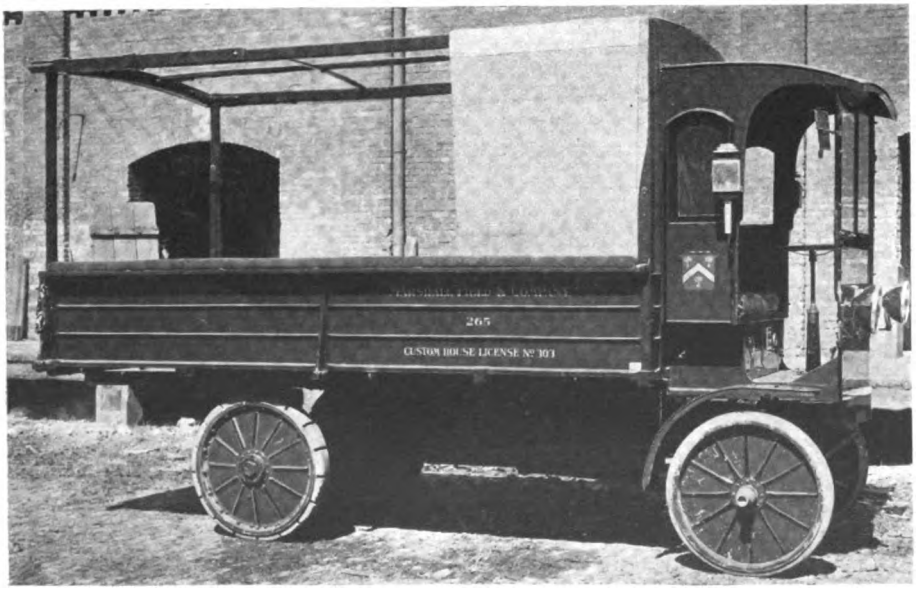


Sullivan 1,000-pound model.

Universal 3-ton motor truck.



Walker Model D.

500-pound delivery van on a touring car chassis.

Details of design are fully given in the specification tables in this issue.

* * *

Sullivan Motor Car Co., Rochester, N. Y.

This concern is making gasoline motor wagons of 1,000 and 1,500 pounds capacity. A specialty is made of machines for plumbers and hardware men. Bodies are made to carry long lengths of pipe or iron without undue lengthening. Several designs are included, among other things, for meat markets and department stores.

Details of design are fully given in the specification tables in this issue.

* * *

Universal Motor Truck Co., Detroit.

This concern specializes in a 3-ton gasoline motor wagon. The motor flywheel comprises a Sirocco type of fan, for cooling purposes. The makers assert of their motor wagon: "No pleasure car traditions, no pleasure car equipment, no pleasure car practices have entered into or hampered the design."

Details of design are fully given in the specification tables in this issue.

* * *

Veerac Motor Co., Anoka, Minn.

This concern makes a 1,000-pound gasoline delivery wagon with a "valveless, explosion-every-revolution, air-cooled motor." With open body it is characterized by the company as "the ideal farmers' car for light hauling or with extra seats for pleasure purposes."

Details of design are fully given in the specification tables in this issue.

* * *

Velie Motor Vehicle Co., Moline, Ill.

This concern, having recently made its entry into the motor wagon field after much careful preparation, announces that its line for 1912 is complete. The company advises as follows:

"We are building a 3-ton model of ordinary 5-ton dimensions, but at a 3-ton price. We have increased the specications of our former 1½-ton model and have changed its rating to 2 tons at the former price. We have added the 1,500 pound box delivery wagon type at $1,600, and an inclosed or panel type package delivery wagon at $1,800. The new type of box delivery wagon as developed is equipped with individual artillery, folding seats, which will permit the driver of folding down the left hand seat so that in case he has a load of pipe or lumber of unusual length, it can be extended beyond the seat even as far forward as the radiator of the car if necessary. This is a very novel feature for a light delivery wagon.

"Knowing as we all do that the tendency of a user of a motor wagon is to overload, although, of course, we do not recommend that the truck be used in service calling for loads greater than the established carrying capacity."

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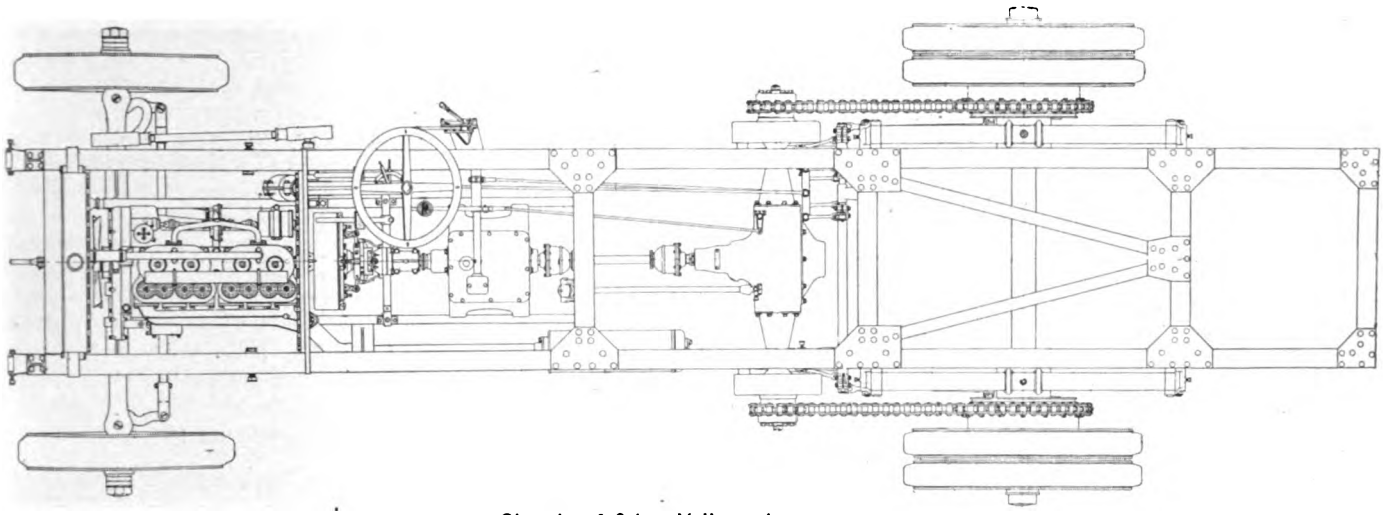


Chassis of 3-ton Velie motor wagon.

Further particulars of Velie motor wagons are given in a separate article elsewhere in this issue.

Details of design are fully given in the specification tables in this issue.

* * *

Walker Vehicle Co., Chicago.

This concern makes the "Walker balance drive" electric wagons. Load ratings are: 750 to 1,000, 1,500 to 2,000, 3,000 to 4,000, 4,000 to 5,000, and 6,000 to 7,000, pounds. The makers claim that the Walker balance drive makes it entirely practical and economical to vary the type and size of bodies to best suit the particular requirements of each user's service, and at the same time produce vehicles which are better proportioned throughout than is possible with chain or shaft-driven vehicles." This drive has already been described in our columns.

* * *

Walter Motor Truck Co., New York.

This concern makes a full line of gasoline motor wagons, of rated load capacities as follows: 1½, 2 , 3½ and 5 tons. The company especially prides itself on its power plants, used in these machines.

Walker electric with panel tops.

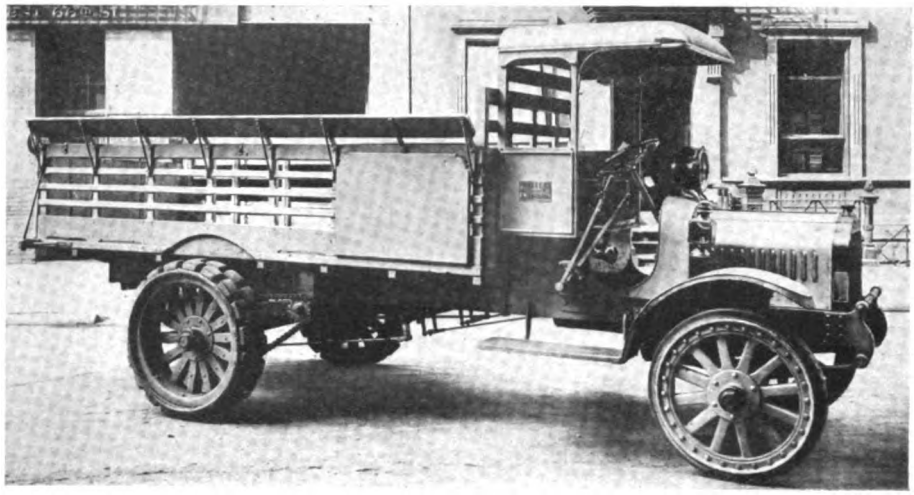
Wyckoff, Church & Partridge, Inc., N. Y.

This concern manufactures the "Commer" motor wagons, of 4½ and 6½ tons capacities. These machines are now being made in America in exact duplication of the British "Commers" and of the same materials as far as possible. The necessary jigs, dies and tools were specially imported from Luton, England, for this purpose.

BIG TIRE MILEAGE.

John J. Boobar, secretary of the Terminal Taxicab Company, Washington, D. C., writes us of a surprising record which was made by a tire recently removed from one of the company's biggest cars. The tire was a 34 by 4 inch Republic smooth tread, and the car weighed 2,800 pounds. This tire rolled up a record of 9,744 miles on the left rear wheel, and 576 miles on the right front wheel—a total of 10,320 miles.

From the time it was installed, June 24, 1910, until it was finally removed, October 1, 1911, it was taken off for repairs only once, on May 30, 1911, when an inside fabric patch was installed at a cost of $1.80. This tire cost the company less than four mills per mile of service.



Walter 5-ton motor wagon.

Walter 2-ton heavy delivery motor wagon.

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The Garden Show.

List of Exhibitors and Their Models. Details of Design of These and Other Machines Are Fully Given in the Specification Tables in This Issue.

FOR TWO principal reasons the motor wagon exhibition to be held in Madison Square Garden from January 15 to 20 will be a trade function of unusual interest. First, it is sure to attract large crowds of buyers, all desirous of observing the progress of design manifest in the models produced by a majority of the oldest, wealthiest and best-known houses identified with the industry. In the second place this exhibition will be almost completely expressive of one of the two dominant types, the electric, the electric division of the industry being represented by 8 of the 31 exhibitors. Although models of all ratings will be shown, those of small capacity will not be nearly so conspicuous as at the "Palace" or Chicago shows. Heavy models of both types, however, will be very numerous.

* * *

Scanning the list of exhibitors one observes five or six firms which have been recently recruited for motor wagon manufacture. The appearance of their models may be taken as a sign that before the present year has passed a great many more concerns, which up till this moment have chiefly concerned themselves with the production of touring cars, will take their cue from this action of their brothers and be numbered with the producers of business models.

It is the intention of the trade authorities next year to merge the two New York shows, a policy which for legal and political reasons has not been possible in the past. In the future the motor wagon shows in New York will be held in the "Palace" building, which is now well furnished for exhibition purposes. The list of exhibitors is as follows:

American Locomotive Co.	Locomobile Co. of America.
Anderson Electric Car Co.	Lozier Motor Car Co.
Autocar Company.	McIntyre Co., W. H.
Baker Motor Vehicle Co.	Morgan Motor Truck Co.
Bronx Electric Vehicle Co.	Packard Motor Car Co.
Brush Runabout Co.	Peerless Motor Car Co.
Buick Motor Car Co.	Pierce-Arrow Motor Car Co.
Cartercar Co.	Pope Mfg. Co.
Garford Motor Truck Co.	Reo Motor Truck Co.
General Vehicle Co.	Sampson Mfg. Co., Alden.
General Motors Truck Co.	Speedwell Motor Car Co.
Grabowsky Power Wagon Co.	Stearns Co., F. B.
Hewitt Motor Co.	Studebaker Auto Co.
International Motor Co.	Ward Motor Vehicle Co.
Knox Automobile Co.	Waverley Co.
	White Company.

A brief description of the products to be placed on exhibition is herewith presented:

American Locomotive Company, New York.

This concern makes the "Alco" gasoline wagons, of the following load ratings: 2, 3½, 5 and 6½ tons. The motor in these machines is quickly accessible by removing either of two long plates at the side. It is fitted with a decompresser, which requires a minimum of compression for starting. The lubrication is automatically governed by the speed of the motor. A sight feed is provided on the dash.

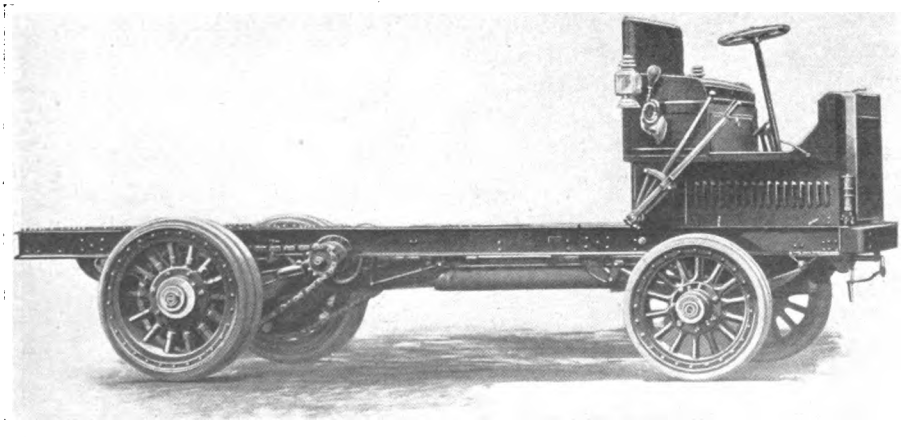
Locomotive principles have been incorporated in the construction of the Alco brakes. These are of the locomotive double shoe type. They are quickly accessible, easily applied, automatic and self-alining.

The emergency brakes are carried on the radius rods, which permits them to be in the proper position regardless of the spring deflection.

The heavy type of machine is fitted with an auxiliary spring that comes into action when 50 per cent of the maximum load is applied. This construction allows the semi-elliptic springs to carry 50 per cent of the maximum load easily, and the strain is partly taken off these springs when a greater load is placed upon the motor wagon.

Details of design are fully given in the specification tables in this issue.

* * *



American Locomotive Company's 5-ton chassis.

Anderson Electric Car Co., Detroit.

This concern manufactures the "Detroit" electric wagons, of the following load capacities: 1,000, 2,000 and 3,000 pounds. These machines are designed especially to use the Edison battery, which, as well as the motor and countershaft, is entirely inclosed.

Details of design are fully given in the specification tables in this issue.

* * *

Autocar Co., Ardmore, Pa.

This concern makes many types of gaso-

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line wagons, as well as sightseers and motor buses, on a standard 3,000-pound capacity chassis.

Details of design are fully given in the specification tables in this issue.

* * *

Baker Motor Vehicle Co., Cleveland.

This company makes electric motor wagons of load capacities as follows: 800 to 1,200 pounds; 1,600 to 2,400 pounds; 3,500 to 5,000 pounds. The particular method of chain drive employed permits the flexible suspension above the springs of the entire power plant and a light solid rear axle construction of unusual strength.

Details of design are fully given in the specification tables in this issue.

* * *

Bronx Electric Vehicle Co., New York.

This concern makes electric motor wagons, but omitted to supply us with particulars or specifications.

* * *

Brush Runabout Co., Detroit.

This concern, which comprises one of the divisions of the United States Motor Company, makes a light gasoline delivery wagon of 600 pounds capacity. It is built for speed rather than for heavy loads,

Brush motor van.

and is especially adapted for local tradesmen and light package delivery.

Details of design are fully given in the specification tables in this issue.

* * *

Buick Motor Co., Flint, Mich.

This concern builds a variety of gasoline wagons and buses with special bodies for different trades and purposes. The standard chassis has a load capacity of 1,000 to 1,800 pounds.

Details of design are fully given in the specification tables in this issue.

* * *

Cartercar Co., Pontiac, Mich.

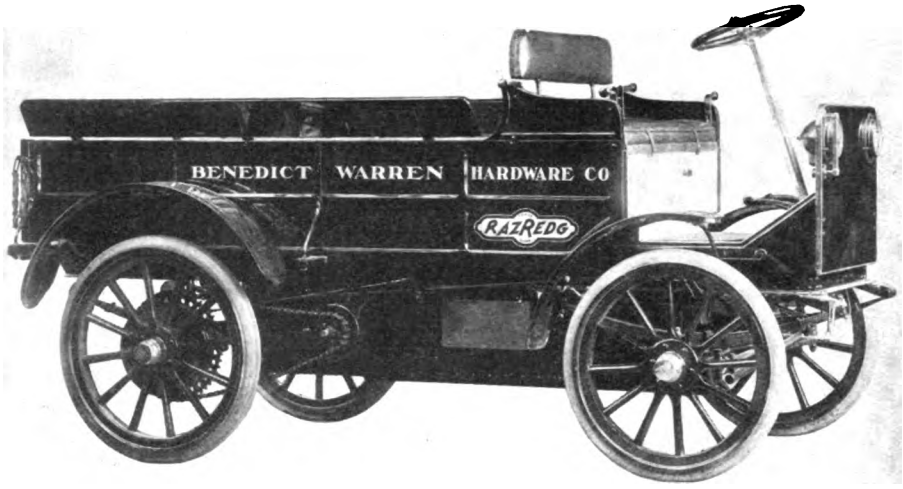
This concern makes gasoline light delivery wagons with several styles of body. The standard chassis has a capacity of 1,000 to 1,500 pounds. The entire motor may be removed simply by removing the radiator, and taking out a few bolts.

Details of design are fully given in the specification tables in this issue.

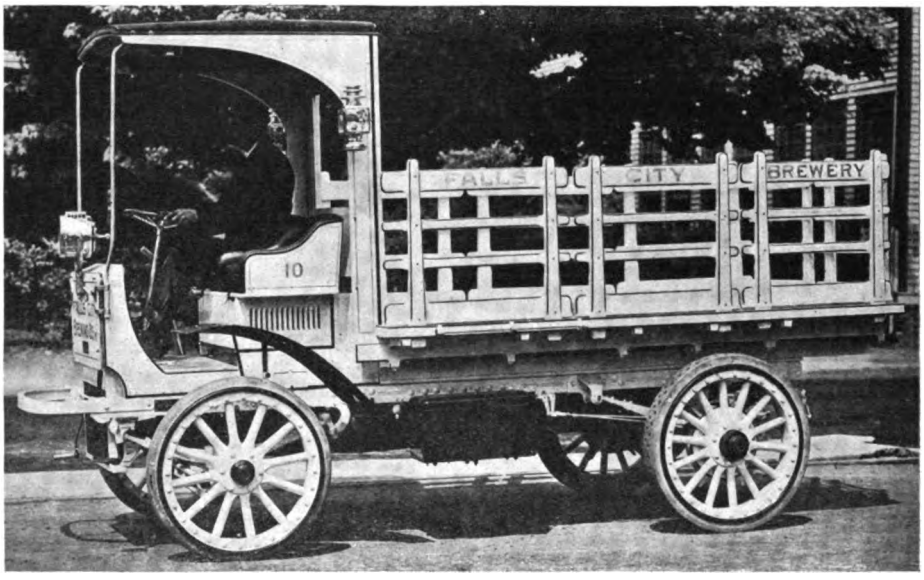
* * *

Garford Co., Elyria, Ohio.

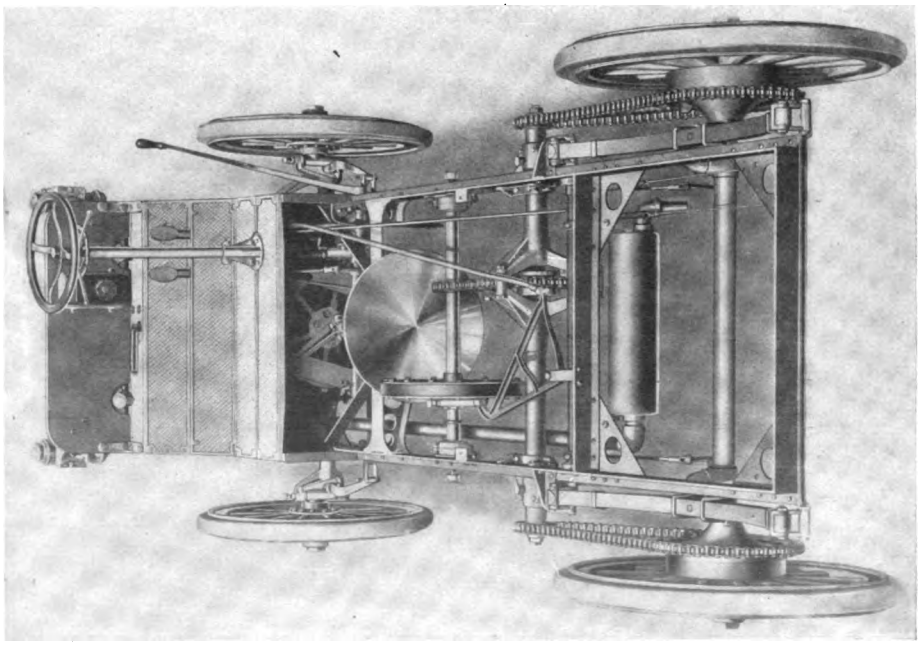
This company makes gasoline motor wagons in 1, 2 and 3 ton models. Several types of body can be fitted. The machines are warranted against defects in workmanship and material for one year.



Anderson Electric Car Company's 1,000-pound electric.



An Autocar model.



Cartercar friction drive model—This picture should be regarded sideways, from the right.

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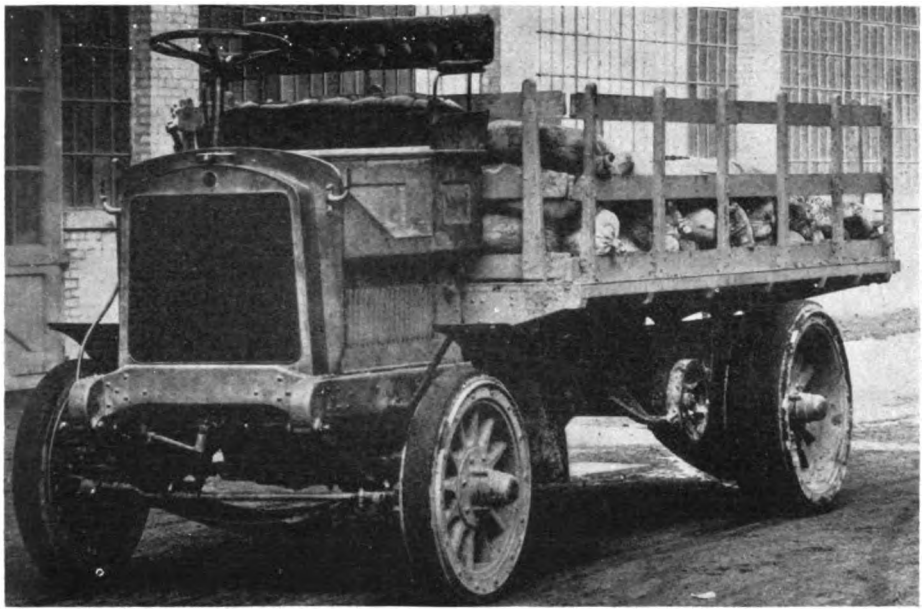


Lozier 5-ton power wagon.

driver's seat, to be taken from the chassis and in cases where a number of trucks are used by one concern, an extra power plant could be installed in thirty minutes' time, leaving the power plant removed to be repaired at leisure. This unit power plant contained in the subframe is divided into two parts, the motor group and the transmission, either of which may be quickly removed independently of the other, while the jackshaft to the rear of the transmission is also supported independently of the other units and may be removed without disturbing other parts of the chassis.

A feature worthy of particular notice is the method in which the cooler and the vital parts of the power plant are protected in the front, these parts being surrounded by the heavy frame of the chassis, the blunt nosed front of the car protecting all vital parts from damage in case of collision; even the starting crank when not in use may be folded back within the protection of the frame.

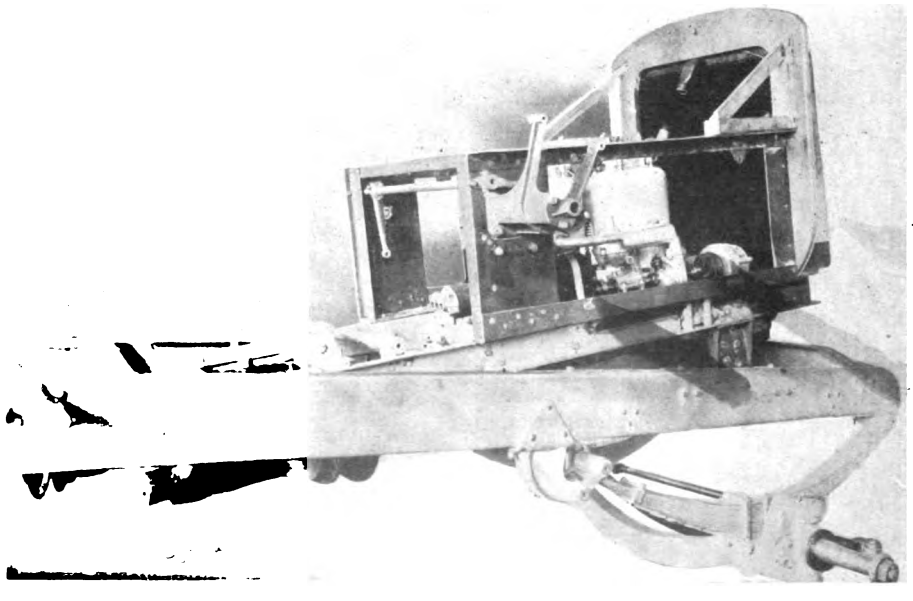
The Lozier truck has been especially designed and built by the Lozier Company for heavy duty truck work. It has a very long stroke in proportion to bore, the bore being 4¼ inches with a stroke of 6½ inches. The motor is offset; the crankshaft is mounted on annular ball bearings. The engine is governed to 900 revolutions per minute. The long stroke, offset motor, ball bearings and the motor governed at a speed producing the greatest efficiency with the lowest fuel consumption are features which have been carefully designed to produce a truck operating with the lowest possible consumption of gasoline and oil. Tests which have been made with the truck loaded with five tons have given an average of between six and seven miles per gallon under average road conditions.

The valves are of nickel alloy all on one side. The crankshaft is mounted on three annular ball bearings and is unusually heavy, eliminating vibration, giving greater efficiency to the motor and long life to the bearings. Camshafts are driven by silent chains in oil-tight case instead of by gears.

Lubrication is a combination of splash and force feed, the splash level being adjustable from the front end of the motor case. Oil is taken from the oil cellar in the crankcase by a gear driven pump and distributed to the bearings and splash pockets, overflowing into the oil cellar through a strainer; the oil cellar has a capacity of three gallons. The gauge on the motor indicates the quantity of oil while the pressure gauge on the dash indicates the action of the oil pump. Bosch, dual system, battery and magnetic ignition is employed, the magneto being located on the rear leg of the motor in an accessible position. The governor operates on a valve in the inlet manifold, separate from the carburetor, thlus allowing the operator to remove the carburetor without disturbing the governing mechanism or breaking the governor seal so that the driver is unable to tamper with the governor through any excuse.

The clutch is of the standard Lozier design with 28 hardened saw blade steel disks inclosed in oil-tight flywheel case. Its permits of extreme flexibility in operation and minimizes strains on motor, transmission and tires. Power is transmitted from the clutch to the transmission through a double universal joint of the block type made of high carbon steel hardened and ground and inclosed in metallic dustproof oil case.

The transmission and jackshaft comprise two separate and distinct units. The transmission is of selective sliding gear type with four forward speeds and reverse, direct drive on third speed, and all shifts made by one lever. Gears and shafts are made of chrome nickel steel, heat treated, and mounted on annular ball bearings. Double annular ball bearings are used to support the drive gear, one on each side of the gear preventing distortion and vibration. The center shaft is mounted on one annular ball bearing on the forward end of the shaft and two on the rear end; the final drive is through chains. Sprocket rims are bolted to the drum and may be removed for replacement. Gear ratios are arranged to give a speed of ten miles per hour on direct or third speed—when running light or on smooth level roads, or in smooth level countries on good state roads, the fourth speed gear may be used, giving a speed of 13 miles per hour. The speed may be further in-



Subframe of Lozier 5-ton truck, showing hinged support at rear, also accessibility to motor by raising subframe.

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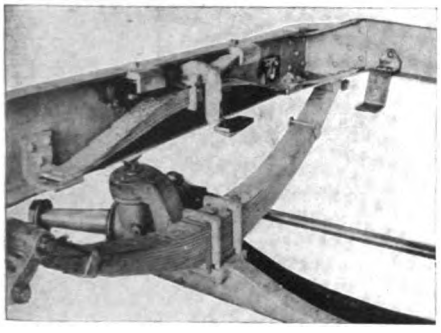
creased by a rearrangement of sprockets.

A differential lock permits the operator to lock both jackshafts together, thus avoiding the turning of one wheel without traction when the truck is on slippery ground. The differential lock is operated by a lever beside the driver's seat and is equipped with a spring which throws it out automatically as soon as the lever is released, thus avoiding the excessive wear on tires were it possible to place the lock in service permanently.

Chains and sprockets are inclosed in pressed steel chain cases made in halves and easily removable; they are both dust and oil tight. A large handhole plate is located in the upper half for purposes of inspection or as a means of filling the case with grease. A brass collar is carried on the jackshaft sprocket rotating in a large groove in the guard enabling the chain to be adjusted without disturbing the chain case.

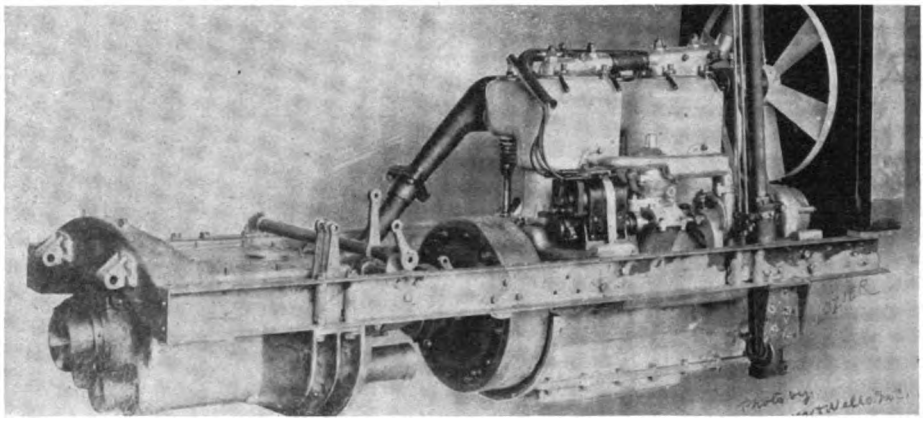
The main frame is of channel section,



Front main spring and subframe on Lozier 5-ton truck.

pressed steel, 8 inches deep and 2 inches wide, tapering from the motor to the front spring hanger. The frame also tapers in the rear from the jackshaft to the rear end of the frame where it is but 34 inches in width, thus allowing the rear springs to be placed outside of the frame, consequently lowering it to 34 inches from the ground.

The jackshaft is inclosed in pressed steel housings extending outward to the sprockets and is suspended from the frame by two split brackets. On the outer ends of the jackshaft housing is an adjustable cage which carries a roller bearing directly under the center of the sprocket. The outside of the cage is spherical in shape, thus forming a ball-shaped member on which a split eccentric is mounted, this split eccentric forming the forward support for the radius rod. The eccentric meshes with a worm cut on a shaft which extends through the radius rod cap in a vertical position and the end of this shaft being squared, permits adjusting the radius rod by means of a wrench, loosening or tightening the chain as desired. The rear ends of the radius rods are supported by a king-bolt through a trunnion



Motor and transmission on the Lozier 5-ton truck are mounted on a subframe which can be removed in 15 minutes.

and bearing fitted to the rear axle. Torsional strains are obviated through the unique method of connection of the radius rod, front and rear, as either one of the rear wheels may be raised to any height without distortion of the radius rods.

The drive shaft between the transmission and the jackshaft case is carried in a pressed steel torque tube, which is piloted over the jackshaft case at the rear, while on the front end, the torque tube carries a sliding sleeve, the forward end of which is spherical in shape and is carried in a housing on the rear of the transmission. This housing incloses the universal joint and transmission bearings, thus making an absolutely dustproof and oil-tight case from the transmission to the jackshaft.

With the Lozier construction, it is possible to slip the torque tube out of the way by removing six belts, allowing the front end of the drive shaft to be dropped down out of the way, the jackshaft being pivoted on the main frame brackets, thus permitting access to the transmission case from the rear or allowing the transmission case to be removed fro mthe subframe without disturbing any of the parts of the jackshaft itself.

The service brakes are mounted on the jackshaft and are of the external contracting type, 14 inches in diameter by 2½ inches in width. The emergency brakes are of the internal expanding type inclosed in the rear wheel drum, 18 inches in diameter with 4-inch faces. All brakes have equalizers and hand adjustments.

The rear sprockets are piloted over the rear brake drum to which they are bolted, while the front sprockets are mounted on the tapered end of the jackshaft and secured by key and nut.

Front and rear axles are drop forged from high carbon, heat treated, open hearth steel of rectangular section 2½ by 3¼ inches. On the front axle, the spring pads are carried below the center of the wheel, the axle having a drop of 5 inches, allowing the lower half of the motor case to be removed without interfering with the axle; also permitting the motor to be placed sufficiently low in the subframe to give a practically straight-line drive from the motor to the rear wheel when the truck is loaded as the subframe is placed on an angle of 1½ degrees.

The semi-elliptic front springs and platform rear springs give flexible suspension. Spring eyes and shackles are bushed with phosphor bronze. Front springs are designed to carry 7,000 pounds load and rear springs, 12,000 pounds load.

The wheels are of the artillery type, 36 by 5 inches front, 40 by 5 inches, dual, rear, all equipped with S. A. E. standard demountable times. The spokes on the rear wheels are offset, bringing the bearings near the spring pads and shortening the leverage or the axle.

Practically every bearing, even where the slightest wear may result, is bushed and equipped with some form of lubrication and may result, is bushed and equipped with some form of lubrication and in case of wear, bushings may be pressed out and new ones inserted.

The price of the chassis complete is $4,800.

* * *

W. H. McIntyre Co., Auburn, Ind.

This concern specializes in light gasoline motor wagons of the following load ratings: 500, 600, 1,200, 1,500, 2,000 and 2,500 pounds.

The chasses of these machines are manufactured from heavy steel, angle section, well riveted and substantially braced where needed. In two of the models the motor is suspended on a sub-frame, thus forming a unit which may be removed without disturbing any other parts.

Details of design are fully given in the specification tables in this issue.

* * *

Mack Bros. Motor Car Co., Allentown, Pa.

This concern makes gasoline motor wagons of the following load capacities: 1, 1½, 2, 3, 4, 5 and 7 tons. Special bodies for these include: express, furniture, brewery (heavy stake body with racks and gates on

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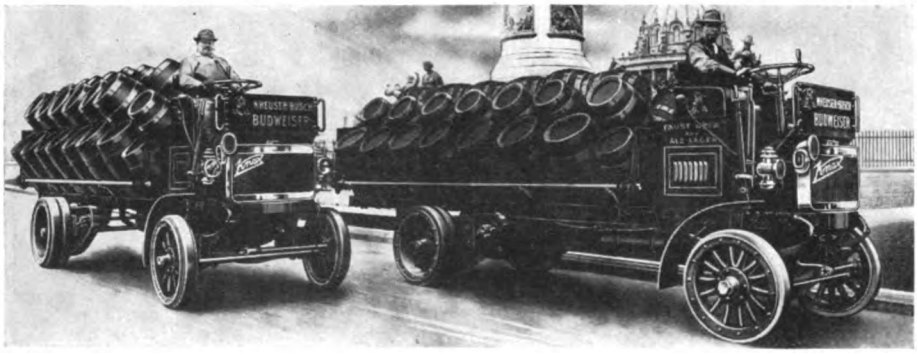


Knox brewery wagons.

each side or loose stakes with chains—also open style without roof, and body with roof top), half van, full van, grocery, stake, dumping (various kinds), etc.

The 2 ton chassis may be furnished, if desired, with the 3 ton rear equipment; the 3 ton chassis with the 5 ton rear equipment; the 5 ton chassis with the 7 ton rear equipment. The "rear equipment" comprises the rear axles, springs, wheels and tires.

The latest specialty of this concern is a 7½ ton dump truck, operated by the power of the driving engine.

Details of design of the standard chasses are fully given in the specification tables in this issue.

Morgan Motor Truck Co., Worcester, Mass.

This concern makes 2, 3 and 5 ton gasoline motor wagons, and furnishes any and all types of bodies to meet the various requirements of the users. The machines are warranted for one year.

The Morgan motor wagon is designed upon the unit system, and comprises essentially four complete units, as follows: engine; transmission, jackshaft and differential; frame and springs; axles and wheels. Any and each of these units may be easily separated from the motor wagon as a whole. Universal joints and couplings are used throughout.

Details of design are fully given in the specification tables in this issue.

Mack special fire chassis fitted with Gould pump.

The Mack 7-ton brewery truck.

Packard Motor Car Co., Detroit.

This concern makes 2 and 3 ton gasoline motor wagons.

The Packard chassis is a complete unit to which any standard or special body may be attached. It is designed to carry 90 per cent of the load on the rear axle, thereby permitting the use of lighter front springs which reduce to a minimum the jar to the motor from traveling over rough pavements, besides making steering easier, reducing the tendency to skid, and securing better traction.

Service brakes are placed on ends of the countershaft, thereby taking all braking strain from the transmission and differential unit; this also is of great advantage owing to three to one reduction by braking through sprockets.

The brakes are designed so that the shoes on both service and emergency brakes are readily replaceable.

A flexible gasoline pipe is provided from the tank to the carburetor to prevent crystallization and breakage.

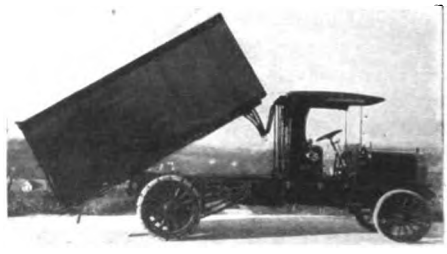
The clutch is completely supported on the crankcase, securing permanent alinement of crank and clutch shafts.

The spark is automatically retarded by the pushing in of the starting crank when the motor is being started.

Motor speed is automatically controlled by sealed governor, with manual control of the throttle within limits of the governor control.

The 3 ton chassis is furnished in four, and 2 ton chassis in two, lengths of wheelbase, each wheelbase having a standard and numerous optional lengths of platform, making the machine adaptable to almost any line of business.

Details of design are fully given in the specification tables in this issue.



Mack 5-ton sawdust dump truck with power hoist.

Peerless Motor Car Co., Cleveland.

This company makes 3 and 4 ton capacity gasoline motor wagons.

The most important features of design are as follows:

Distribution of load, which is about 80 per cent over the rear wheels, giving adequate traction and allowing the use of light flexible front springs, which minimize vibration on the motor.

Fifty-six inch rear springs in connection with exceedingly large rear wheels, which make for the maximum economy in tire mileage and for easy riding qualities.

Long stroke, slow speed motor operating

(Continued on p. 81.)

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Motor Wa

Maker	Normal load rating	Chassis list price	Nature of transmission	Position of transmission	No. of forward	Maker of steering gear	Steering control, right, left or centrl	Location of differential
Anglaise M. C. Co.	700	$ 800	P.	R. axle		Foster	R.	
Bessemer M. T. Co.	1000	1000	F.		4	Ross	R.	
Buckeye Mfg. Co.	1000	1175	S. G.	Motor		Own	R.	R. axle
Byron Motor Co.	1000	1000	S. G.	Subf.		Warner	R.	R. axle
B. F. Board M. T Co.	1000	*1375	Int. g'r	Center		Own	L	J. S.
Brush Runabout Co.	600		Comb.	Flywh'l		Own	R.	
Brooks Latta A. M. Co.	1000							
Cameron Car Co.	600			R. axle		Own	R.	R. axle
Cameron Car Co.	800		F.	U. F.	4	Lavigne	R.	R. axle
Commerce M. C. Co.	1000		R.	Wheels			C.	
Duryea Auto Co.	600							
			F.	Center		Foster	R.	Trans.
Dispatch M. C Co.	600	625						
			F.	Center	4	Foster	R.	Trans.
Dispatch M. C. Co.	1000	750	P.	Flywh'l				R. axle
Ford Motor Co.	750		P.	J. S.			R.	J. S.
Geneva Wagon Co.	1000	1250	S. & G	Motor		Gemmer	L.	R. axle
Herresboff Motor Co.	750	950	F.		4	Own	L.	
Hatfield Co.	1000	850	S. & G.	Unit		Lavigne	R.	R. axle
Ideal Com. Car Co.	1000	950						
International Harvester Co.	1000		F.	Center	4	Lavigne	L.	J. S.
Imperial Wheel Co.	800	700	P.	J. S.		Gemmer	R.	J. S.
W. Landshaft & Son.	1000	900	P.	Motor		Own	R.	J. S.
Mercury Mfg. Co.	1000	750					L.	J. S.
Motor Wagon Co.	800	610	P.	J. S.		Own	R.	J. S.
W. H. McIntyre Co.	800	600	S. G.	Motor		Own	R.	Axle
W. H. McIntyre Co.	800	800	S. G.	Motor		Thomas	L.	R. axle
Newark A. Mfg. Co.	1000		F.	U. seat		Foster	L.	R. axle
Pratt, Carter, Sigsbee Co.	800	775	F.	U. seat		Lavigne	R.	
Poss Motor Co.	1000	800	S. G.	R. Axle		Regal	R.	R. axle
Regal M. C. Co.	1000	1000	ear P.				L.	J. S.
Sullivan M. C. Co.	1000	925	S. G.	Center		Warner	R.	R. axle
Staver Cge Co.	1000	*2250						
Warren M. C. Co.	1000							

* With body. † Valveless. ‡ Trans[mission]. C. C. N. S.—Channel [gear]. D.—Dual. Dia.—Diame[ter]. A.—Artillery. A. I.—[Annular] Jump spark. L. & C.—[Leather] Roller. Right. Rear. R. Exp.—Expanding. F.—Flo[ating]—Splash and gravity. S. [Under] H.—Under hood. U. S.—wood. S.—Steel. S. B.—S[teel] W. & N.—Worm and nut.

or Wagon

Maker	Normal load rating	Chassis [price]	Nature of transmission	Position of transmission	No. of forward	Maker of steering gear	Steering control, right, left or central	Location of differential
Alden Sampson Mfg. Co.	1500	$140	S. G.					Trans.
Atlas M. C. Co.	1500	160	S. G.	Central		Gemmer	L.	
Automobile Mfg. & E. Co.	1500		S. G.	U. F.		Gemmer	L.	R. axle
Bartholomew Co.	1500	190	S. G.	R. axle		Own	R.	R. axle
H. H. Babcock Co.	1500	140	S. G.	J. S.		Gemmer	R.	J. S.
Carterear Co.	1500		F.	Center	4	Own	R.	J. S.
Chase M. T. Co.	1500	90	P.	Central		Barnes	R.	J. S.
Coleman C. & H. Co.	1200		S. G.	Central		Foster	R.	J. S.
Chicago Pneumatic Tool	1500		P.	J. S.		Gemmer	R.	J. S.
Dennison Co.	1500	180	S. G.	Motor		Own	L.	R. axle
Dorris M. C. Co.	1500	200	Type S. G.	Motor		Gemmer	R.	R. axle
Huron River Mfg. Co.	1500		P.	Central		Gemmer	R.	J. S.
Ideal Auto Co.	1500	145	S. G.	J. S.		Own	R.	J. S.
Kearns M. C. Co.	1500	97	F.		4	Gemmer	R.	J. S.
Khael M. C. Co.	1500	150	S. G.					
Lippard-Stewart M. C. Co.	1500		S. G.	Central			L.	R. axle
Mora P. W. Co.	1500			Central			L.	J. S.
W. H. McIntyre Co.	1500	95	P.	J. S.		Own	R.	J. S.
W. H. McIntyre Co.	1500	120	P.	J. S.		Own	R.	J. S.
Newark Auto Co.	1500		S. G.	R. axle		Gemmer	L.	R. axle
Oliver M. C. Co.	1500	140	Co. P.	Motor		Lavigne	L	R. axle
Ren M. T. Co.	1500		S. G.	Central			R.	R. axle
Rowe Motor Co.	1500	210	n P.	Motor		Ross	R.	J. S.
Schmidt Bros.	1500	100	P.	J. S.		Columbia	L.	J. S.
Siebert M. W. Co.	1250	110	ear P.				L.	J. S.
Sullivan M. C. Co.	1500	95	P.	J. S.		Bultman	L.	J. S.
Veerac Motor Co.	1500	85	S. G.					
Victor M. C. Co.	1500		S. G.	J. S.		Barnes	R.	J. S.
Wichita Falls M. Co	1200	140						

A.—Artillery. A. I.—[Annular] Jump spark. L. & C.—[Leather] Roller. Right. Rear. R. Exp.—Expanding. F.—Flo[ating]—Splash and gravity. S. [Under] H.—Under hood. U. S.—wood. S.—Steel. S. B.—S[teel] W. & N.—Worm and nut.

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Maker	Normal Load	Maker of front axle	Shape and dimensions of front axle	Nature of material of front axle	Ground clearance, front axle	Maker of rear axle	Sectional shape and dimensions of rear axle	Nature of material of rear axle	Ground clearance rear axle (in.)	Normal road speed (m. p. h.)	Maximum road speed (m. p. h.)	Material and section of frame	Percentage wgt. of chassis on rear axle	Percentage wgt. of loaded truck on rear axle	Dimension (in.) of platform	Platform height, empty (in.)	Platform height, loaded (in.)	Percentage overload capacity
Abresch-Cramer A. T. Co.	200	don	I	S.	10	Sheldon	Square			15		C. P. S.		65	106x46	38		50
Adams Bros.	200		I 2½	S.	14	Own	2½ dia.	S.	16	18	18	P. S.	50	75	96x48	43	41	None
Atterbury M. C. Co	200	don	1½x1½	S.	16	Sheldon	Square	S.	18	10	15	C. C. S.						
Beck & Son	200																	
Bessemer M. T. Co.	200																	
Bessemer M. T. Co.	200	don	I	S.	9	Sheldon	1½x2½	S.	10	15	25	C. S.	66	75	96x48	39		50
B. F. Board M. T. Co.	200	en	I	S.	11½	Ligget	2½x1½ I	S.	16½		15	C. S.				41		
Buckeye Mfg. Co	200	ken	I	N. S.	10	Timken	I.		14	18		C. S.	30	60			34	50
Byron Motor Co	200	don	Square	S.	17	Sheldon	Square	S.	17	20	30	P. S.	50	65	102x48		35	
Cameron Car Co	200		Square	S.			Square	S.		10	15	R. W.						
Chase M. T. Co	200		Square	S.			Square	S.		10	15	R. W.						
Chase M. T. Co.	200		I	S.	11	Own	2x2	S.	17	15	15	P. S.	60	73	102x66			50
Federal M. T. Co	200		2½ dia.	N. S.	10½	Own		N. S.	11½		21	Wood		76	96x60		42	
H. H. Franklin Mfg. Co.	200		I 2½x2½	S.		Own	2 7/16x1¾	N. S.		15	15	C. S.			96x57		44	
General M. T. Co	200		I	S.			I.	S.		20		P. S.						
Grabowsky P. W. Co	200		1½x1¾	S.		Own	2½ dia.	S.			17	C. S.		60				
Gramm M. T. Co	200		3 I	S.	12	Own	2½ dia.	S.	15	15		A. I.			84x48	34		100
Hatfield Co	200																	
Hewitt Motor Co.	200	don	1½x2½	S.	16	Sheldon	2½x2½	S.	16	12	18	Ash & S	40	60	90x44	33		None
Ideal Auto Co.	200		I	S.							25	P. S.			96x60			
Kissel M. C. Co	200	ken	I	S.	11	Timken						C. S.	66	66				
Kopp M. T. Co.	200	don	1½x2	S.	15	Sheldon	2x2	S.	17	12	15	C. S.	33	75	108x40	37	35	25
W. Landshaft & Son	200	don	I 2½	S.	12	Sheldon	2½x2½	S.	14	15	20	C. S.		80	120x48			25
Lauth-Juergens M. C. Co.	200	don	I 2	S.	11	Sheldon	2x2	S.	13	15	18	A. S.		80	120x48			25
Lauth-Juergens M. C. Co.	200		I 1½	N. S.	13	Own	1½x2½	N. S.	17	17	20	C.P.S.				36		50
Mack Bros. M. C. Co.	200		Rect.	S.	12	Own	Rect.	N. S.	15½	14	17	C. P. S.	40	65	96x48	36	33	
National M. T. Co.	200	eldon	1½x2	N. S.	13	Sheldon	2½x2½	N. S.	16	18	25	C. S.	55	45	108x48	34	32	50
Nelson & LeMoon	200	eldon	1½x1¾	S.		Own	1½x1½	S.		15	15	C. S.						
W. H. McIntyre Co	200	eldon	1½x1¾	S.		Own	1½x1½	S.		15	15	C. S.						
W. H. McIntyre Co	200	n	Tubular	S.	12	Own	1½x1½	N. S.	12	14	14	C. S.	51	62	96x46	41	38½	25
Randolph M. C. Co	200		I 2½x1¾	S.	15		2x1¾	S.	17	12	17	C. S.	25	55	108x48	35	33	50
Sanford-Herbert Co	200	eldon	1½x2½			Sheldon	2x2			14	22	C. P. S.						
Siebert M. W. Co	200		Rect.	S.	12		Square	C. N. S.			18	P. S.		92	96			25
Stegeman M. C. Co	200	eldon	Square	S.	17	Sheldon	Square	S	18	18	20	C. S.	50	75	90x44	36	33	25
Schmidt Bros Co.	200	ken	1½x2½	S.		Timken	1½x2½	S.				C. S.						
Victor M. C. Co	200	don	1½x2½	S.	10	Sheldon	2½x2½	S.	16	14	17	C. S.	30	80	103x62	42	38	50

‡ International Motor Co., Dis

W.—Double irreversible worm. D. S. E.—Double semi-elliptic. D. S.—Differential screw. Double screw. E.—Elliptic.
A.—Artiller axle. R. C. S.—Rolled channel steel. R. H.—Rear hubs. R. & P.—Rack and pinion. R. W.—Rear wheels. Reinforced
Exp.—Expanding V. or Vert.—Vertical. V. in H.—Valve in head. V. S.—Vanadium steel. W.—Worm. W. & G.—Worm and gear.
wood. S.—Steel.
W. & N.—Worm

Maker	Maker of front axle	Shape and dimensions of front axle	Nature of material of front axle	Ground clearance, front axle	Maker of rear axle	Sectional shape and dimensions of rear axle	Nature of material of rear axle	Ground clearance rear axle (in.)	Normal road speed (m. p. h.)	Maximum road speed (m. p. h.)	Material and section of frame	Percentage wgt. of chassis on rear axle	Percentage wgt. of loaded truck on rear axle	Dimension (in.) of platform	Platform height, empty (in.)	Platform height, loaded (in.)	Percentage overload capacity
Alden Sampson Mfg. Co.	wn	I		11		2x2		16	18		P. S.		66	108x60	44	41	
American Eagle M. C. Co.	wn	Square	N. S.	9	Own	Square	N. S.	15	20	25	Ch. I.						
Autocar Co.	eldon	Tube	S.	11	Own		C. N. S.	11			P. S.			Opt.			
Beck & Son		1½x1½	S.	16	Sheldon	Square	S.	18	10	15	C. C. S.						
Blair Mfg. Co		Square	S.			Square	S.		10	15	R. W.						
Chase M. T. Co.		1½x2½	N. S.	9		2x2	N. S.	12	¶15		C. P. S.	66	66	138x72	40	38	
Decatur M. C. Co.	wn	I	S.	11				10			C. P. S.						
Garford Co		I.	S.			I.	S.		15								
Grabowsky P. W. Co.		I 1½x2½		13		2x2½		15¼		15	C. S.	60		114x60	37		
Harwood Barley Mfg. Co.	eldon	2x2½	S.	16	Sheldon	2½x2½	S.	16	10	15	C. P. S.	40	60	120x60	37		None
Hewitt Motor Co.	wn	I 1½	N. S.	13	Own	2½x2½	N. S.	17	16	18	C. P. S.						50
Ideal Auto Co	wn	Tube	N. S.		Own	Round	N. S.		15	15	C. N. S:			Opt.			
Mack Bros. M. C. Co.	eldon	1½x1½	S.		Own	1½x1½	S.		15	15	C. S.						
Mais M. T. Co.	mken	I 2x2½		12½	Timken	1½x2½		6	15	20	C. S.		60				
W. H. McIntyre Co.	eldon	2x2½	N. S.	13	Sheldon	2½x2½	N. S.	15½	15	20	C. S.	55	45	110x48	35	33	33
Moreland M. T. Co	mken	I.	S.	13	Own		S.	16	12	20	P. S.	50	85	132x60	46	42	33
Nelson & LeMoon	wn	1½x2½	N. S.	11	Own	1½x2½	N. S.	16	¶15	a17	C.C.N.S	25	60	114x52	46	43	25
Oliver M. C. Co.	eldon	I.		14	Sheldon	1½x2½		16	15	22	Channel	40	70				50
Sandusky M. T. Co.	eldon			10	Own	Round	N. S.	16½	12	15	P. S.		60				
Thomas Elevator Co	wn	1½x2	S.	12	Own	2x2½	S.	17	15	15	Channel	60	60	120x60	35	33	50
U. S. Motor Truck Co	mken		V. S.	11½	Own	4 tubing	S.	16	15	15	I.			144x66	34½		25
Universal Mach. Co.			S.	12			S.			18	C. S.						
Velie M. V. Co.																	
Walter M. T. Co.																	

* Above motor † 60 rear

W.—Double irreversible worm. D. S. E.—Double semi-elliptic. D. S.—Differential screw. Double screw. E.—Elliptic.
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Maker	Normal load	Maker of front axle	Shape and dimensions of front axle	Nature of material of front axle	Ground clearance, front axle	Maker of rear axle	Sectional shape and dimensions of rear axle	Nature of material of rear axle	Ground clearance rear axle (in.)	Normal road speed (m. p. h.)	Maximum road speed (m. p. h.)	Material and section of frame	Percentage wgt. of chassis on rear axle	Percentage wgt. of loaded truck on rear axle	Dimension (in.) of platform	Platform height, empty (in.)	Platform height, loaded (in.)	Percentage overload capacity
																		50
Abresch-Cramer A. T. Co.	40			S.	10½	Timken		S.	15½	17½		C. S.	45	65	121x40½		36	
American Locomotive Co.	40	en	I.	S.	9	Own	Square	S.	9	12	20	S. S.			144x60	36		25
Atlas M. C. Co.	40		I 3	S.	14	Own	2½ dia.	S.	16	15	15	P. S.	50	75	120x60	43	41	None
Atterbury M. C. Co.	40		D bar	A. S.	15	Own	2½ dia.	C. R. S.	16½		20	F. S.			123x52	39		
Avery Co.	40	on	1¾x1¾	S.	16	Sheldon	Square	S.	18	10	15	C. C. S.						
Beck & Son.	40	on	I.	S.	10	Sheldon	2½x3	S.	12	16	25	C. S.	66	66	132x54	41		50
B. F. Board M. T. Co.	40	on	I.	S.	11	Sheldon	2½x2½	S.	16½	13	14	R. C. S.	60	60	Opt.	41	38	25
Brodesser M. T. Co.	40	t	I.	S.	10	Ligget	2x2½ I	S.	15		15	C. S.				46		
Buckeye Mfg. Co.	40	en	I.	N. S.	11	Timken	I.		14	15		C. S.	30	60			34	25
Byron Motor Co.	40		Square	S.			Square	S.		10	15	R. W.						
Chase M. T. Co.	40											P. S.			120x72			
L. H. Colvin.	40	en	I 2½x3½	S.	10½	Timken	1½x2½	S.	16½	15	20	C. S.	50	60	128x51½	44½	41½	25
Dayton A. T. Co.	40		I 2½x3	S.		Own	3x2	N. S.		13	13	C. S.			132x64		44	
General M. T. Co.	40		I.	S.			I.	S.		15								
Grabowsky P. W. Co.	40		2½x2½	S.		Own	2½ dia.	S.			16	C. S.		60				
Gramm M. T. Co.	40																	
Hewitt Motor Co.	40	en	I 2	A. S.		Own	2½x2½	R. S.		18	22	S. S.			144x72			50
Jarvis M. & S. Co.	40		I.	S.			2½x3½	S.			25	P. S.			120x60		39	
Kissel M. C. Co.	40	en	I.	A. S.	9	Own	Round	A. S.	14	15	18	S. S.	70	80	132x60	49		
Knox Auto Co.	40	en	I.	A. S.	9	Own	Round	A. S.	14	12	15	S. S.	60	70	120x60	49		
Knox Auto Co.	40	en	I.	A. S.	9	Own	Round	A. S.	14	12	15	S. S.	60	70	120x60	50		
Kopp M. T. Co.	40	ken	I.	S.	11	Timken	Rect.	S.	16	18		C. S.	66	66	Opt.	42	38	
Lauth-Juergens M. C. Co.	40	don	I 2½	S.	12	Sheldon	2x2	S.	16	14	18	C. S.		80	142x66			25
Lewis M. T. Co.	40	ken	I.	S.	12	Timken	2x2	S.	16½	12	20	C. S.	50	65	120x60	36	32	25
aMack Bros. M. C. Co.	40	n	I 1½	N. S.	13	Own	2½x2½		17	14	16	C. P. S.				36		
W. H. McIntyre Co.	40		1¼x2½	S.		Own	3x3	S.		12	15	C. S.						••
Messinger Mfg. Co.	40	kem	I.	A. S.	13	Timken	Rect.	A. S.	16	12	15	C. S. S.	33	66	168x48	36	33	30
Modern M. T. Co.	40	nken	I 2½x3¼		11	Timken	2½x3½		16½	15	15	C. S. S.			138x66	44	40	50
Morgan M. T. Co.	40	n	I 3½	N. S.	12	Own	2½ dia.	N. S.	15½	16	16	C. S.	40	65	120x60	41	38	50
Motor Conveyance Co.	40		2x2½	S.	13		2½x3		16	12	15	S. S.	60	65	120x72	46	40	20
Packard M. C. Co.	40	n	I.	S.	10	Own	I.	S.	10	14	14	R. C. S.	60		106½x60	43		
Packers M. T. Co.	40		I.	S.	14		Rect.		16½	12½		C. S.			120x54	42		50
Rowe Motor Co.	40		I.		12		Rect.		12	12	15	A. S.	70	80	108x52	45		
Sayers & Scovill Co.	40	aken	I 3x2½	S.	10	Timken	2x2	S.	16	12	12	S. C. S.			144x56			
Stegeman M. C. Co.	40		Rect.	S.	12		Square	C. N. S.			15	P. S.		92	128 long			25
Victor M. C. Co.	40	nken	I 2½x3½			Timken	1½x2½					C. S.						
Walter M. T. Co.	40			S.	12			S.			18	C. S.						

a International Motor Co., Di

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wood. S.—Steel.
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Maker	Normal load	Maker of front axle	Shape and dimensions of front axle	Nature of material of front axle	Ground clearance, front axle	Maker of rear axle	Sectional shape and dimensions of rear axle	Nature of material of rear axle	Ground clearance rear axle (in.)	Normal road speed (m. p. h.)	Maximum road speed (m. p. h.)	Material and section of frame	Percentage wgt. of chassis on rear axle	Percentage wgt. of loaded truck on rear axle	Dimension (in.) of platform	Platform height, empty (in.)	Platform height, loaded (in.)	Percentage overload capacity
																		50
Abresch-Cramer A. T. Co.			I		11		3½x3½		16½	13		P. S.		66	144x66	45	42	
Alden Sampson Mfg. Co.			I 3½	S.	12	Own	3½ dia.	S.	16	13	13	S. S.	50	75	144x72	44	41	None
Atterbury M. C. Co.			D. bar	A. S.	16	Own	2½ dia.	C.R.S.	17½		15	F. S.			148x76	46½		
Avery Co.		don	I	S.	9		2½x3½	S.	15	11	15	C. S.		70	168x72	42	40	60
C. L. Barker.			2x2	S.	16	Sheldon	Square	S.	18	10	15	C.C.S.						
Beck & Son.																		
Blair Mfg. Co.		idon	I	S.	10	Sheldon	2½x5½	S.	12	16	25	C. S.	66	66	156x60	43		50
B. F. Board M. T. Co.		idon	I	S.	11	Sheldon	3x3	S.	16½	11	12	C. R. S.	60	60	Opt.	41	38	25
Brodesser M. T. Co.		et	I	S.	10	Ligget	2½x3½I	S.	15	12	12	C. S.				41		
Buckeye Mfg. Co.		ken	I	N. S.	11	Timken	I	P. S.	16	12		C. S.	30	60			34	17
Byron Motor Co.		ken	I	S.	12	Timken	2½x3½	S.	16½	12	15	S.			Opt.			
E. S. Clark.		en	I 2½x4	S.	11½	Timken	2½x3½	S.	16½	12	18	C. S.	50	60	144x67½	45	42	66
Dayton A. T. Co.			Rect.	S.	8½	Own	Rect.	S.	12	10	12	C. P. S.						
Garford Co.			I	S.			I	S.		12		S. S.						
Grabowsky P. W. Co.			2½x2½	S.		Own	3½ dia.	S.			14.5	C. S.		60				
Gramm M. T. Co.																		
Hewitt Motor Co.		en	I 3	A. S.		Own	3x3	R. S.		15	18	S. S.			144x72			50
Jarvis M. & S. Co.		ken	I	S.	10	Own	2½x3	S.	16	12	15	C. S.	40	65	144x66	41	38	50
A. R. King Mfg. Co.			I				2½x4			12	16	C. S.			147½x72			
Kissel M. C. Co.		en	I	A. S.	10	Own	Round	A. S.	14	12	15	S. S.	60	70	144x72	50		
Knox Auto Co.		ken	I	S.	11	Timken	Rect.	S.	16	15		C. S.	66	66	Opt.	42	38	
Kopp M. T. Co.		don	I 3	S.	12	Sheldon	2½x3½	S.	17	14	18	C. S.		80	168x72			33
Lauth-Juergens M. C. Co.			2½x4½	S.	10½	Own	4x4	S.	12	Opt.	12	C. S.	50	66	144x72	44	42	25
Longest Bros.			2½x2½	N. S.	12	Own	2½x2½	N. S.	16	12	16	C. S.			144x48			50
Lauth-Juergens M. C. Co.			1¼x2½	S.		Own	3x3	S.		10	12	C. S.						
Longest Bros. Co.			I 4	N. S.	11	Own	3 dia.	N. S.	15½	12	12	C. S.	40	65	144x72	42	39	
eMack Bros. M. C. Co.		ken	I 2½x3½		12½	Timken	2½x3½			12	17	C. S.		60				
W. H. McIntyre Co.			2½x3	S.	13		2½x3½		16	10	12	S. S.	60	65	120x72	46	40	20
Morgan M. T. Co.			Tube	N. S.		Own	Round	N. S.		12	12	Opt.						
Moreland M. T. Co.		ken	I 2½x3	S.	9½	Timken	2½x3½	S.	14½	12		C. S.	60	60				
Motor Conveyance Co.			Rect.	S.	10	Own	Rect.	S.	10	12	12	C. R. S.	50		140x72	46		
Mais M. T. Co.			I 2x3½	S.	11	Own	I 2½x3½	S.	17		14.5	C. S.	52.5	77.5	72 sq.ft	43½	40	25
New Haven T. & A. Works.			I	S.			Solid				12	C. R. S.			168x72	46		Yes
Packard M. C. Co.		en	I	S.	13½	Timken	2½x3½	S.	16½	10	16	C. R. S.	50	90	150x66	44	41	
Peerless M. C. Co.			Rect.	S.	12		Square	C.N.S.			12	P. S.		92				25
Pope Mfg. Co.		en	I 2½x4	S.	12	Timken	2½x3½	S.	16	10	12	C. P. S.	50	60	180x78	36		50
Schacht M. C. Co.		en	I		10	Timken	2½x3½		16½	12	15	C. S.		75	144x72	44	40	16
Stegeman M. C. Co.			2½x2½	S.	13	Own	2½x3	S.	16½	12	12	C. S.	60	60	144x72	36	34	50
Transit M. C. Co.			I 3½x2½	S.	11	Own	3½x2½	S.	16	12	12	C. S.	50	70	144x72	42	39	50
U. S. Motor Truck Co.		en	I	V. S.	11½	Own	4 dia.	S.	18	12	12	I	60	75	168x72	34½		25
Universal Mach. Co.		en	I 2½x3½	S.		Timken	2½x3½	S.				C. S.						
Universal M. T. Co.				S.	12			S			18	C. S.						
Velie M. V. Co.																		
Victor M. C. Co.																		
Walter M. T. Co.																		

*Alongside driver. † Ab

W.—Double irreversible worm. D. S. E.—Double semi-elliptic. D. S.—Differential screw. Double screw. E.—Elliptic.
A.—Arti axle. R. C. S.—Rolled channel steel. R. H.—Rear hubs. R. & P.—Rack and pinion. R. W.—Rear wheels. Reinforced
Exp.—Expand V. or Vert.—Vertical. V. in H.—Valve in head. V. S.—Vanadium steel. W.—Worm. W. & G.—Worm and gear.
wood. S.—St
W. & N.—Wo

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Maker	Normal load rating	Chassis list price	Nature of transmission	Position of transmission	No. of forward speeds	Maker of steering gear	Steering control, right, left or central	Location of differential
American Locomotive Co	7000	$3650	S. G.	Center	3	wn	R.	J. S.
Blair Mfg. Co	7000	3750	S. G.	J. S.	3		R.	J. S.
General Motors T. Co	7000	3500						
Hewitt Motor Co	7000	3500	S. G.	Center	3	wn	L.	
Knickerbocker M. T. M. Co	7000	3500	S. G.	J. S.	3	oss	R. or L.	Center
Knox Auto Co	8000	4000			4			
Loser Motor Co	8000		S. clutch	Center	3	wn	R. or L.	Trans.
*Mack Bros. M. C. Co	8000	4250						
Packers M. T. Co	7000	3400	S. G.	J. S.	3	oss	R.	J. S.
Peerless M. C. Co	8000		S. G.	J. S.	4	wn	R.	J. S.
Speedwell M. C. Co	8000	3400	S. G.	Subf	3	oss	L.	J. S.
Stegeman M. C. Co	8000	3950	S. G.	Motor	3		L.	Center
Walter M. T. Co	7000	3500	S. G.	J. S.	3		R.	J. S.

* 65 rear † 68½ rear ‡ with tires

C. C. N. S.—Channel ch D.—Dual. Dia.—Diamet
Jump spark. L. & C.—L Roller. Right. Rear. R.
Splash and gravity. S. & H.—Under hood. U. S.—

A.—Artillery. A. I.—
Exp.—Expanding. F.—Fl
wood. S.—Steel. S. B.—
W. & N.—Worm and nut.

Wagons

Maker	Normal load rating	Chassis list price	Nature of transmission	Position of transmission	No. of forward speeds	Maker of steering gear	Steering control, right, left or central	Location of differential
Alden Sampson Mfg. Co	10000	$47	S. G.		3			
American Locomotive Co	10000	47	S. G.	Center	3	wn	R.	J. S.
C. L. Barker	10000	36	S. G.	Aft.	3		L.	Trans.
E. S. Clark	10000	42	S. G.	J. S.	3		L.	J. S.
Dayton Auto T. Co	10000	45	S. G.	Center	4	oss	L.	J. S.
Garford Co	10000		S. G.	J. S.	3	wn	R.	Trans.
General Motors T. Co	10000	42	S. G.	Motor	3		R.	J. S.
Grabowsky P. W. Co	10000	42	S. G.	Center	4		L.	J. S.
Gramm M. T. Co	10000	42				oss	R.	J. S.
Hewitt Motor Co	9000	42	S. G.	J. S.	3			
Jarvis M. & S. Co	10000	42	S. G.		4	Warner	R.	J. S.
Kissel M. C. Co	10000	42	Dogs	Center	3			
Knickerbocker M. T. M. Co	10000	45	S. G.	J. S.	3	wn	L.	
Knox Auto Co	10000	450	S. G.	Center	3	oss	L. or R.	Center
Kopp M. T. Co	10000		Dogs	Center	3		R.	
Lewis M. T. Co	10000	450	S. G.	J. S.	4	wn	R.	J. S.
Locomobile Co	10000	450	S. G.	Center	4	wn	R.	J. S.
Longest Bros. Co	10000	350	S. clutch	Center	3	wn	R.	Center
*Mack Bros. M. C. Co	10000	480	Mesh.	Center	3	wn	R. or L.	Trans.
Morgan M. T. Co	10000	47	S. G.	J. S	4	oss	R.	Trans.
Moreland M. T. Co	10000		S. G.	Center	3	oss	R.	J. S.
New Haven T. & A. Works	10000	450	S. G.	J. S.	4	wn	R.	Trans.
Peerless M. C. Co	10000		S. G.	Center	3	wn	R.	J. S.
Pierce-Arrow M. C. Co	10000	450	S. G.	Center	4	wn	R.	R. axle
*Saurer Motor Co	9000	500	S. G.		4			Trans.
F. B. Stearns Co	10000		S. G.	Center	4	wn	L.	J. S.
F. B. Stearns Co	10000	38	S. G.	J. S.	3	Warner	R.	J. S.
Shelby M. C. & T. Co	10000	39	S. G.		3			
Victor M. C. Co	10000	43	S. G.	J. S.	3		R.	J. S.
Walter M. T. Co	10000	42						

* International Motor Co., distributor

C. C. N. S.—Channel c ble. D.—Dual. Dia.—Dia
Jump spark. L. & C.— R.—Roller. Right. Rear.
Splash and gravity. S. & U. H.—Under hood. U.

A.—Artillery. A.
Exp.—Expanding. F.—
wood. S.—Steel. S.
W. & N.—Worm and nu

he Motor

Maker	Normal load rating	Chassis list price	Nature of transmission	Position of transmission	No. of forward speeds	Maker of steering gear	Steering control, right, left or central	Location of differential
J. Jaccard & Co. (Aries)	14000					Own	R.	Trans
Hewitt Motor Co	11000							
Hewitt Motor Co	14000		S. G.	Center	3			
Hewitt Motor Co	20000		S. G.	J. S.	3			
Knox Auto Co	120000		S. clutch	Center	3	Ross	L. or R.	Center
*Mack Bros. M. C. Co	14000		S. G.	Center	3	Own	R. or L.	Trans.
Motor Conveyance Co	12000		S. G.	Center	4		R.	J. S.
*Saurer Motor Co	13500		S. G.	Subf.	3	Own	R.	Trans.
Speedwell M. C. Co	12000		S. G.	Motor	3	Ross	L.	J. S.
Stegeman M. C. Co	12000		S. G.		3		L.	Center
Victor M. C. Co	14000		S. G.		3			
Victor M. C. Co	20000							

* International Motor Co., Distri

n. C. C. N. S.—Channel c ible. D.—Dual. Dia.—Di
Jump spark. L. & C.— R.—Roller. Right. Rear.
Splash and gravity. S. & U. H.—Under hood. U.

A.—Artillery.
Exp.—Expanding. F
wood. S.—Steel. S
W. & N.—Worm an

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G

MAKER	Maker of transmission	Nature of transmission	Position of transmission	No. of forward speeds	Wheels and tires detachable	Type of steering gear	Maker of steering gear
Beck & Son	odel	P.	B. engine	3		Ball	Ross
Bessemer M. T. Co.							
Bessemer M. T. Co.							
Bessemer M. T. Co.							
Buckeye Mfg. Co.						W. & G.	Columbia
Buckeye Mfg. Co.	ambert	F.		All		W. & G.	Columbia
Buckeye Mfg. Co.	ambert	F.		All		W. & G.	Columbia
Buckeye Mfg. Co.	ambert	F.		All		W. & G.	Columbia
Buckeye Mfg. Co.	ambert	F.		All		W. & G.	Columbia
Chicago P. T. Co.	mbert	F.		All	es	W. & S.	Gemmer
Day Auto Co.	vn	P.	J. S.	2	es		Gemmer
H. H. Franklin M. C	own-Lipe	S. G.	Motor	3	o	W. & G.	Own
General Motors T. C	vn	S. G.	Center	3		D. S.	
General Motors T. C	vn	S. G.	J. S.	4		D. S.	
Knox Auto Co.	vn	S. G.	J. S.	4		W. & N.	Ross
Knox Auto Co.	vn	S. G.	Motor	3		W. & N.	Ross
Knox Auto Co.	vn	S. G.	J. S.	3		W. & N.	Ross
Knox Auto Co.	vn	S. G.	J. S.	3		W. & N.	Ross
Lippard-Stewart M.	vn	S. G.	J. S.	3	o	W. & S.	
Oliver M. C. Co.		S. G.	Center	3	es		Lavigne
Packard M. C. Co.	wn	P.	Motor	2		W. & S.	Own
Packard M. C. Co.	wn	S. G.	J. S.	3		W. & S.	Own
Pratt, Carter, Sigsbee	wn	S. G.	J. S.	3		W. & G.	Foster
Rowe Motor Co.	wn	F.	U. S.	7		W. & N.	
Schacht M. C. Co.		S. G.	Center	3		W. & G.	Barnes
Shelby M. C. & T. C	da	S G.	Center	3	o		Warner
Victor M. T. Co.	vert	S. G.	J. S.	3			
Victor M. T. Co.		S. G.		3			
Victor M. T. Co.		S. G.		3			
Victor M. T. Co.		S. G.		3			
Victor M. T. Co.		S. G.		3			

* Inclosed sight

A. C. S.
side. R. F. &

I.—Inclosed. J. S.—Jump
U. S.—Under seat. V. or

ary. P. S.—Pressed s

Elect

Chains open or inclosed	Standard wheel base	Track or gauge	Front axle, make and dimensions	Steering control right, left or central	Wheel or lever steer	Frame material and section	Nature of
O.	80	56	I 1½x	L.	W.	C. S.	Op
..	86	54	Tube	L.	W.	R. S.	
	80						
	85	56½	Box	L.	W.	S. S. C.	
	90	56½	Box	L.	W.	S. S. C.	
O.	74	52	I 2½		W.		
O.	81½	55	1½x1½	L.	Lever	S. angle	
O.	70	56	2 tub	L.	Lever	S. angle	
O.	82	56	1½x1½	L.	W.	Trussed	
Opt.	86	56	I	L.	W.	C. P. S.	
O.	88	56	I	L.	W.	R. W.	
I.	87	54					
O.	84	58	I 1½x	L.	W.	C. S.	Op
	96	54	Tube	L.	W.	R. S.	
O.	85	56	I 1½x	L.	W.	C. P. S.	
		56	I 2x2				
	100	56½	Box	L.	W.	S. S. C.	
O.	102	60	1½x1½		W.		
O.	88	56	1½x2	L.	W.	C. S.	
O.	100	56	I	L.	W.	C. P. S.	
O.	97½	60		L.	W.	R. W.	
O.	97½	60		L.	W.	R. W.	
O.	96	62	1½x3	L.	W.	C. S.	Op
O.	95	56	I 2x2	L.	W.	C. P. S.	
	116	66	Box	L.	W.	S. S. C.	
O.	111½	61	2 5/16		W.		
	112		I	L.	W.	C. P. S.	
O.	118	60		L.	W.	C. S.	
O.	120	64	I 2½x	L.	W.	C. P. S	
	115	66		L.	W.	S. S. C.	
	132	66		L.	W.	S. S. C.	
	96	66	Truss	R.	W.	C. S.	
	96	72	Truss	R.	W.	C. S.	
O.	126	65	2½ dl		W.		
O.	139	69	2½ dl	L.	W.	C. P. S	
	124		I	L.	W.	C. P. S.	
	136		I	L.	W.	C. S.	
O.	120	73		L.	W.	C. S.	
O.	140	73					

losed. J. S. Jackshaft. L

S. S. C.—Structural s

I

Gear reduction	Chains open or inclosed	Standard wheel base	Track or	Frame material and section	Nature of bumper, if any	Type of front wheels	
11.5 to1	O.	96		C. S.	Tube	A.	A
9½ to 1		90		S. S. C.		A.	A
11½ to 1		100		S. S. C.		A.	A
8 to 1		100		C. P. S.			

Drum. E.—Elliptic. G. E.—
P.—Steering post. S. S.—

. S.—Pressed steel. R.
—Wheel. West.—Westingl

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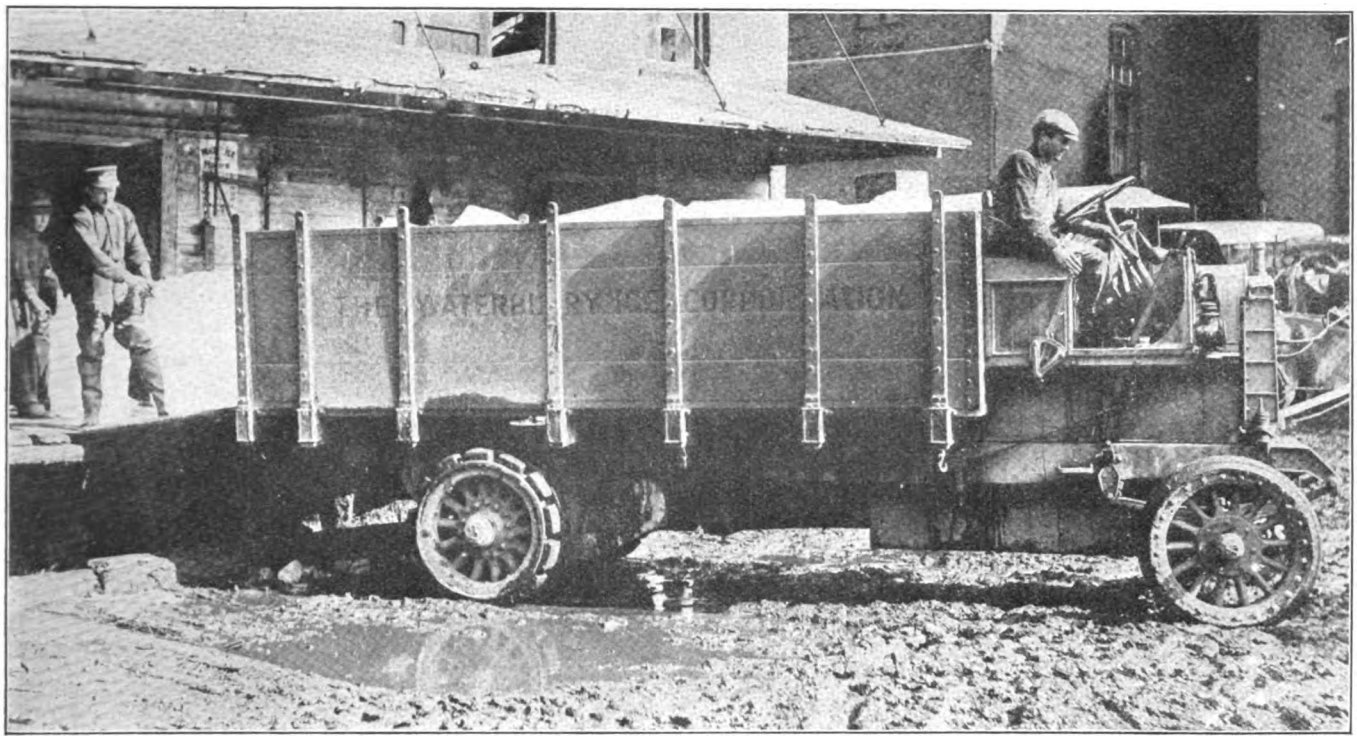

Weigh this Evidence

IF you are handling perishable goods, a motor truck is essential to you. Take as an illustration the economy effected by a 5-ton Sampson truck in the business of the Waterbury Ice Corporation in Waterbury, Conn.

Horses drawing three tons per load, three trips daily, between the ice-house and the loading platform, covered a total of 18 miles, at a cost of 60 cents per ton.

Under the identical conditions the Sampson 5-ton truck averaged 4½ trips daily over the same route and hauled 590 tons a month at an average cost of 32 cents per ton.

A total of 22½ tons hauled, as against 9 tons by horse propulsion—a saving of 28 cents on every ton hauled, of $1.40 on every trip, of $4.20 on every three trips, of $6.30 on a day's haulage, aside from the fact that 2½ times as much work was done.

In computing the cost, every item of expense has been included in these figures.

The actual saving effected aside from the increased business made possible, was $165 per month.

On an actual computation of costs covering the handling of 14,000 tons of ice, an advantage of $3920 in favor of the truck was actually shown on the company books.

The same conditions exist in your business.

When the horses are idle they must be fed; they tire with a given amount of work, and cannot be worked overtime without deterioration.

The truck can do double work without tiring, if necessity demands it.

The saving alone would permit you to discard your truck equipment and renew it every 30 months.

If you are not handling perishable goods, the possible saving may not be as great, but the principle is the same—a vastly increased opportunity of business, greater facility in transacting this business, and a substantial economy, as well.

We have actual results to show in a hundred different lines of business—no doubt in your line.

We will be glad to lay the facts before you, if you will consider them.

Send for our representative to call, or ask us to send particulars.

ECONOMY UNITED STATES MOTOR CO UTILITY

Alden Sampson Manufacturing Co. 47 West 61st St. New York

Division of UNITED STATES MOTOR COMPANY

Free Monthly Inspection Service of all our cars for Twelve Months.

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The Durable Dayton

Now offered to the Buyer and Dealer in a complete selling line —a model for every service required in motor transportation.

Model H—Capacity 1½ Ton
Model K—Capacity 3 Ton
Model M—Capacity 5 Ton

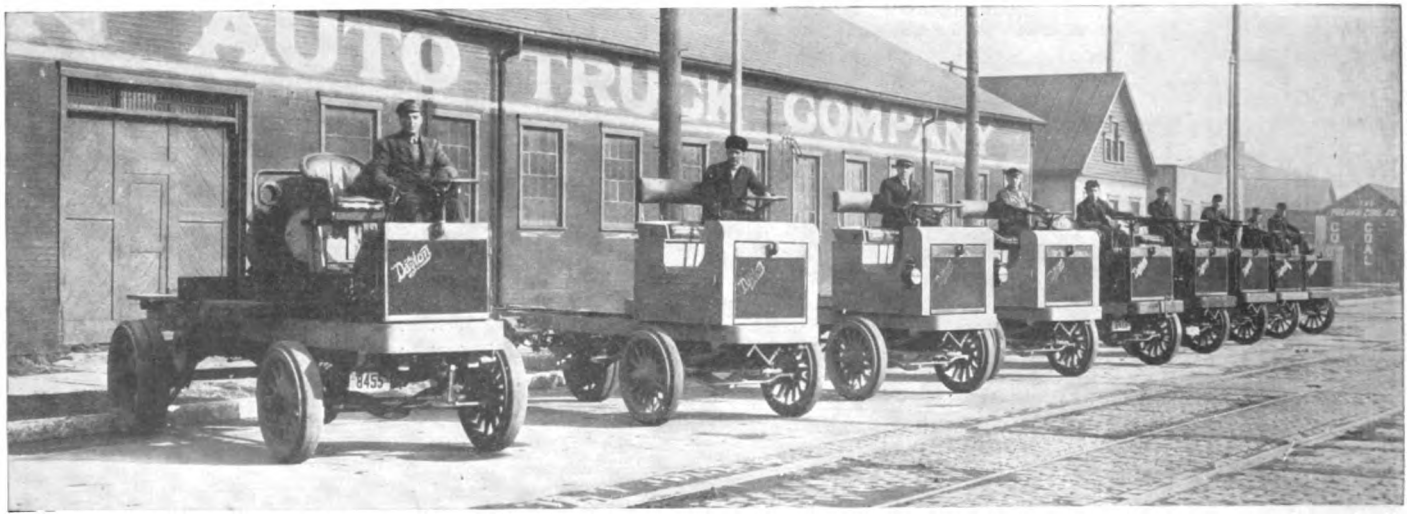
The most dependable line of *Specially Designed* Motor Trucks produced by any one concern in the industry.

Dealers will readily appreciate the excellent opportunities in handling a dependable model to fit every business condition.

Judging from the reputable dealers who have already concluded business connections with us, it is evident that our selling policy is recognized as the same high character which dominates the entire Durable Dayton factory and organization.

There are are several good makes of motor trucks on the market. The Durable Dayton is one of them. No buyer or dealer should contract for motor wagons until he has at least given us the opportunity to demonstrate the merit of our models.

Send for our List of Dealers and Highly Satisfied Users.



DURABLE DAYTON MODELS H, K AND M—READY FOR ROAD TEST

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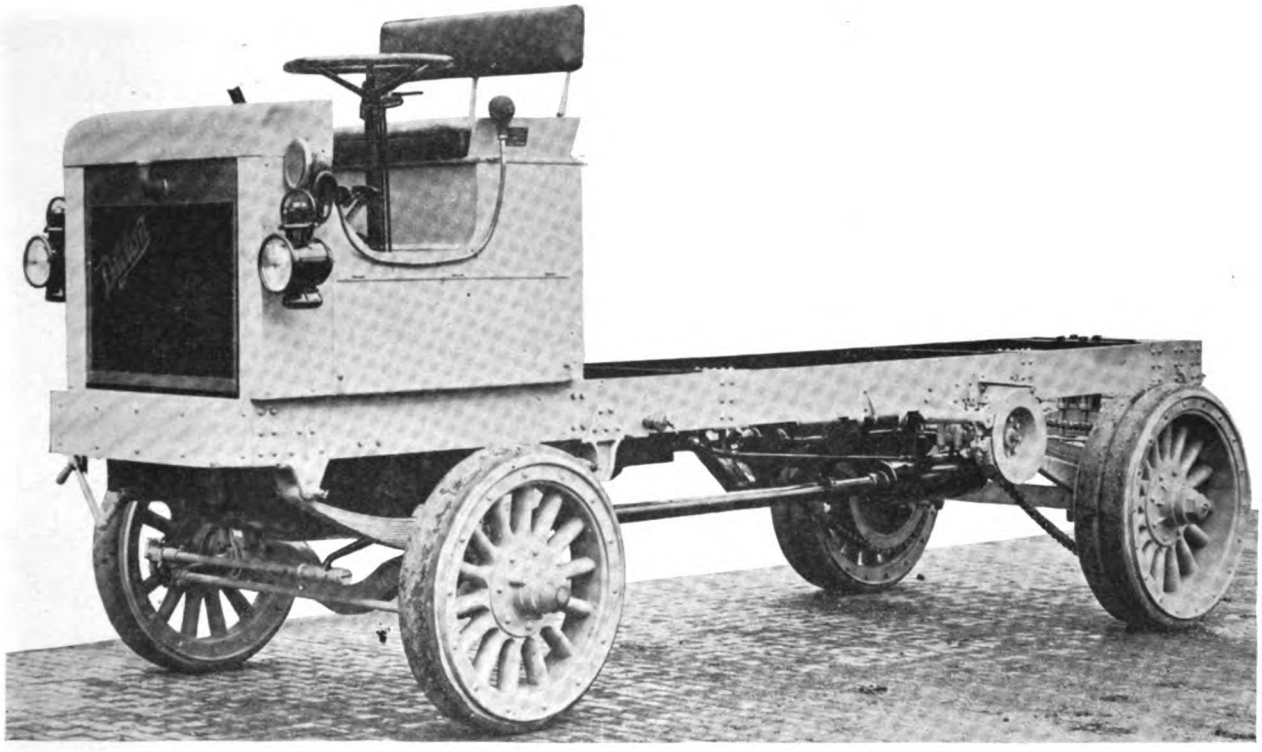
New Model M—Capacity 5 Ton



See our complete line at New York Show—Grand Central Palace—January 10-17, 1912.

Also at the National Show—Chicago—February 3-10, 1912.

Choice Territory open to discriminating dealers. Investigate THE DURABLE DAYTON before closing for 1912.

Complete Illustrated Catalog mailed upon receipt of inquiry—Send for a Copy TODAY.

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Master Builders of Dependable Motor Trucks and Power Wagons

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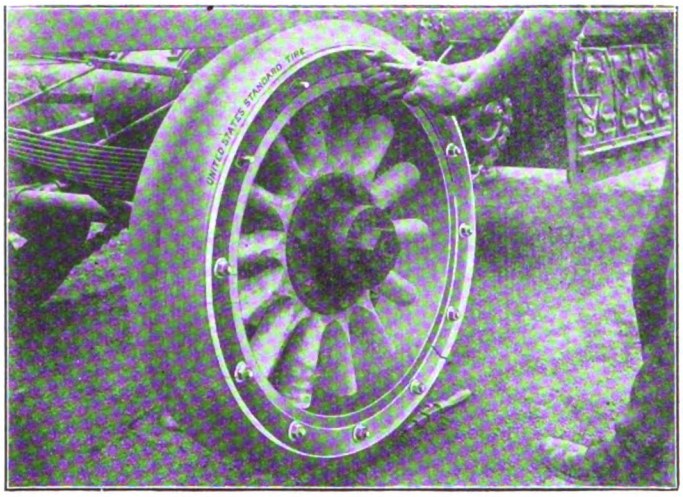
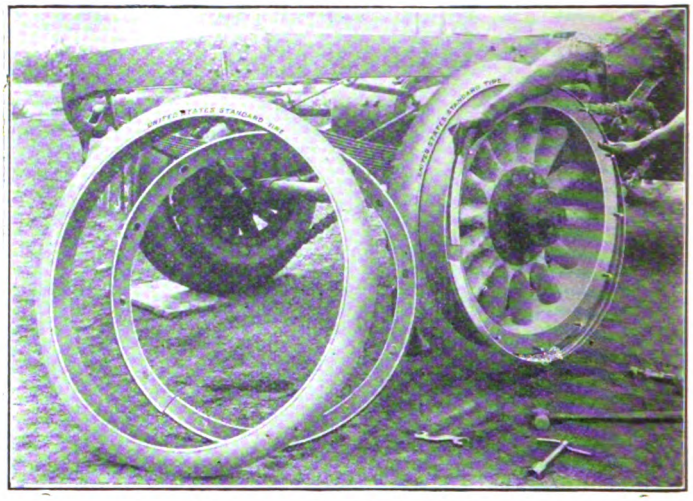
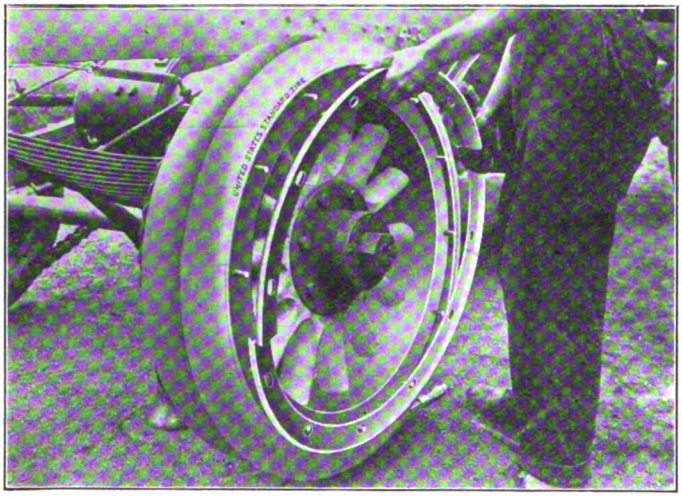
A complete tire change in fifteen minutes' time



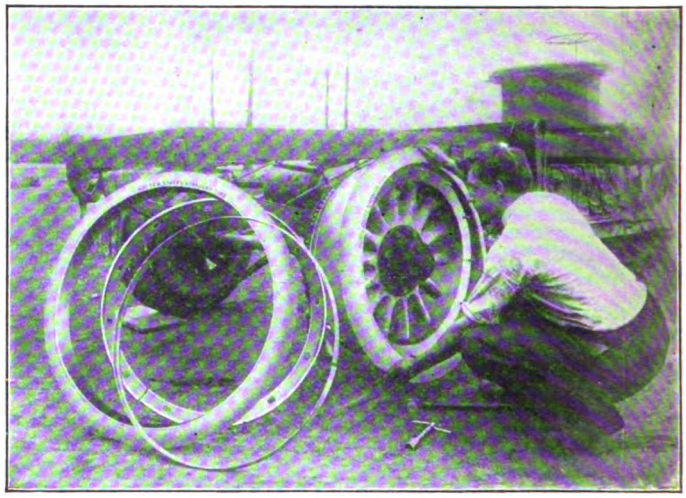
NO. 1—JACK UP THE WHEEL AND REMOVE THE NUTS AND WASHERS



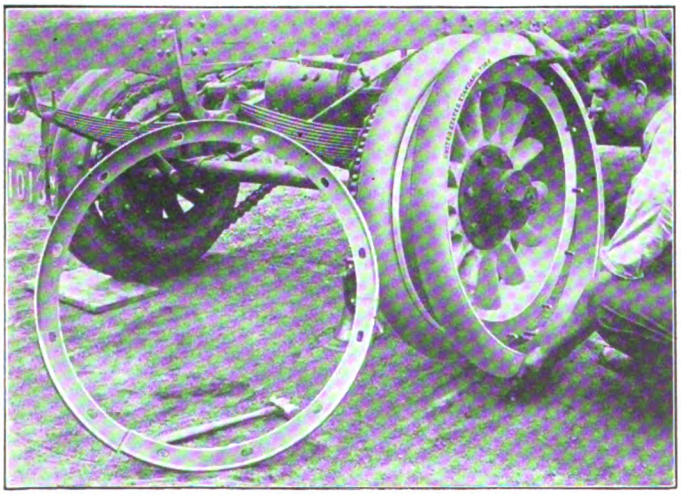
NO 4—AFTER WHICH THE CENTER WEDGE RING IS REMOVED



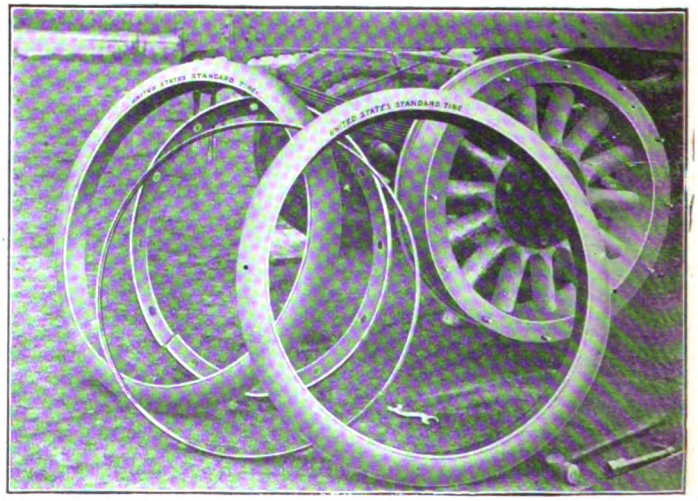
NO. 2—SLIP OFF THE OUTSIDE FLANGE WEDGE RING AFTER LOOSENING IT WITH A TAP OF THE HAMMER



NO. 5—NOTICE THAT THE TWIN TIRE IS BEING REMOVED WITHOUT TAKING OFF THE WHEEL



NO. 3—THE OUTSIDE TIRE SLIDES OFF EASILY; NO POUNDING, PRYING OR JERKING IS NECESSARY



NO. 6—TWO RINGS AND TWO TIRES (NOTICE THE EXTREME SIMPLICITY) REMOVED WITHOUT DISTURBING THE WHEEL

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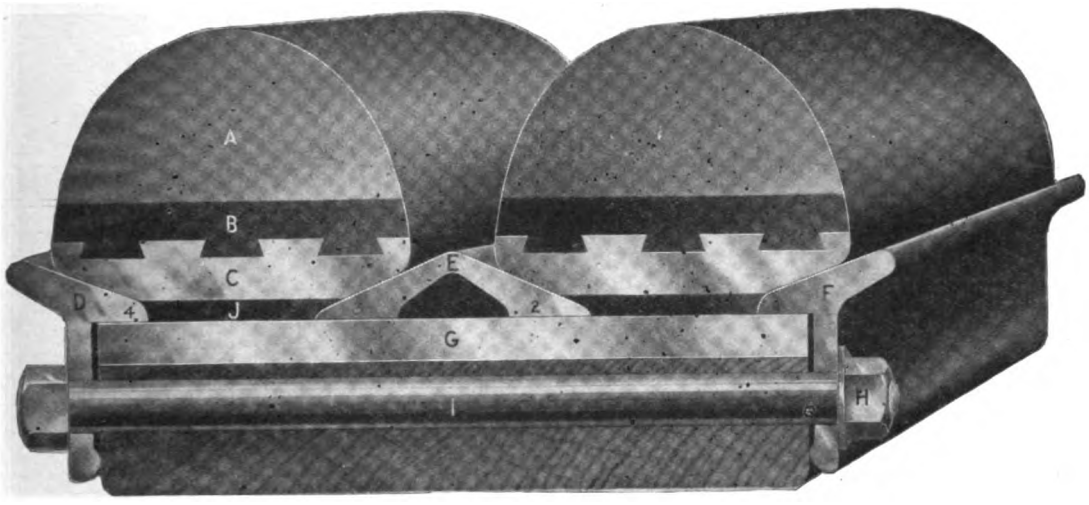
Here is the tire that has made it possible



CROSS SECTION VIEW OF UNITED STATES STANDARD TWIN TIRE AND DEMOUNTABLE RIM

A—Tough Rubber Tread
B—Hard Rubber Base
C—Metal Base
D—Inside Flange Wedge Ring
E—Center Wedge Ring
F—Outside Flange Wedge Ring

The New United States Standard Motor Truck Tire (Demountable)

Made by the

UNITED STATES TIRE COMPANY

Look at those pictures on the opposite page — they tell the story far better than words.

Did you ever hear of a tire that even approached this one in simplicity?

Did you ever hear of a tire that could be removed or applied by the driver himself, anywhere, any time, and without even taking off the wheel?

And, besides saving you days, yes weeks, of time now lost in making tire changes, it will cut a big slice off your tire bills because it is

absolutely guaranteed for 10,000 miles of service

conditional upon its being used within one year's time.

If you are on the lookout for a method of increasing the efficiency of your trucks and cutting down your delivery cost, write us today for a free copy of

"A Revolution in Tires for American Motor Trucks"

You will be interested in knowing that this is the first tire placed on the market to conform to the specifications recently adopted by the Society of Automobile Engineers.

United States Tire Company

BROADWAY AT 58th STREET, NEW YORK

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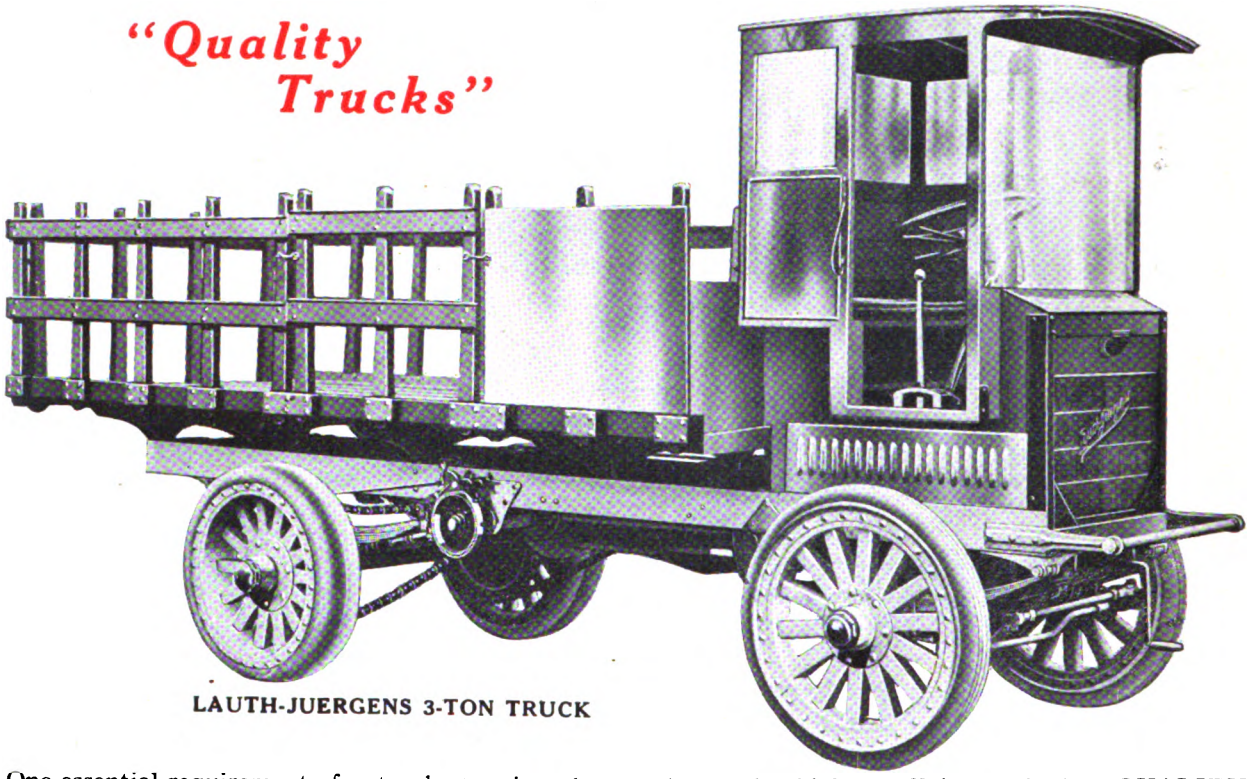
Lauth-Juergens

ONE, TWO AND THREE-TON TRUCKS

"Quality Trucks"



LAUTH-JUERGENS 3-TON TRUCK

One essential requirement of a truck, to give the purchaser the highest efficiency, is the "QUALITY" of material and workmanship, the sound engineering construction, which permits of long life without costly repairs, and a maker of ample responsibility, who is able to stand back of a guarantee in the fullest sense of the word.

The other essential requirement is the never ending "SERVICE" which we give you thru the proper channels. The organization we have in connection with our factory will permit you to get SERVICE under all conditions —that service which keeps your truck running daily no matter what happens. We are prepared to afford you this distinct service and no other manufacturer of Motor Trucks, large or small, gives you service equal to that which we give.

With a guarantee of QUALITY and SERVICE your investment in a Lauth-Juergens Truck is secure and a paying one.

Lauth-Juergens trucks represent the highest type of construction in Motor Truck building. The motors are guaranteed for the life of the truck, the truck is guaranteed against imperfect workmanship and material—every part of it—and we are financially able to stand back of any proposition or guarantee we make to any purchaser of Lauth-Juergens trucks. They are in a class by themselves and the QUALITY we give you gives you delivery insurance.

Reliable parties who are seeking an opportunity to handle a high-grade truck should communicate with us at once regarding 1912 territory.

Watch for us at the shows—Grand Central Palace in New York and Armory in Chicago.

Address

THE LAUTH-JUERGENS MOTOR CAR CO.

FREMONT, OHIO

CHICAGO, ILL.
THE LAUTH-JUERGENS MOTOR CAR CO.
2630-32 Wabash Ave.

NEW YORK
WEST SIDE GARAGE AND MOTOR CO.
160-162 West 101st Street

BOSTON, MASS.
LAUTH-JUERGENS MOTOR CO. OF NEW ENGLAND
11 Harcourt St.

NEWARK, N. J.
MERCHANT'S MOTOR CAR COMPANY
Essex Building

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Lauth-Juergens Features Four Speed Trasmission

The four speed transmission used in our one, two and three ton Models has a three point suspension and is housed as a unit with the Differential and Jackshaft. It has a reverse gear which drops into mesh and is never in motion except when in use. The entire transmission and jackshaft is fitted with Hess-Bright ball bearings, including the end thrust ball bearing on either end of the shaft of the transmission not engaged. The large case is made of aluminum alloy, making it both light and strong. The gears are cut from solidcy cloid steel, tempered and hardend to a degree which will give it the most efficiency. This transmission is made entirely in our own factory by experts of long training who enable us to offer you the latest to be had in transmissions.

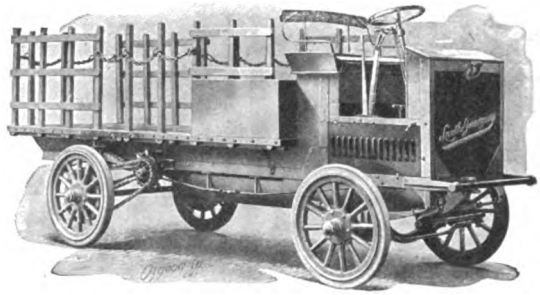
3 Piece Dry DISC CLUTCH

A modern invention perfected to such a degree that it will wear indefinitely and can not get out of order, is positive in operation and the simplest clutch made. It consists of 3 pieces, two steel discs between which is a wood fibre disc attached to the flywheel, and when in operation the two steel discs clamp evenly and tight to the wood fibre, making a positive engagement. It is operated off the flywheel by roller bearing and has a ball bearing foot thrust.

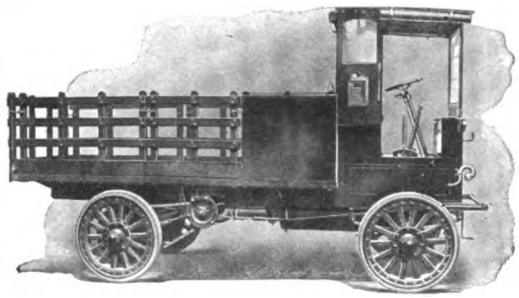
OTHER FEATURES

The other features are the Mea Magneto which is optional equipment for the three ton trucks, the double Ignition System, and the complete upholstered cab which is furnished as a part of the chassis.

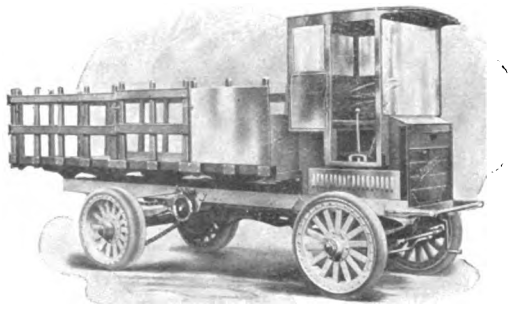
2 Cylinder, Model F, One Ton Truck. Price $1750.00 Complete with Body and Painted and Lettered.



4 Cylinder Model G, One Ton Truck. Price $2100.00 Complete with Body and Painted and Lettered.



4 Cylinder Model H, Two Ton Truck. Price $2850.00 Complete with Stake Body, and Paint and Lettering.



4 Cylinder Model I, Three Ton. Price $3400.00, Complete With Stake Body, Painted and Lettered.

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BUILT ON STEEL

GOOD

WIRE

TIR

THE B.F. GOOD

AKRON,

Digitized by Google

WEAR LIKE STEEL

RICH

LESS

ES

RICH CO.
OHIO.

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A good week's work.

GROWTH OF THE KNOX CO.

The Knox Automobile Company built its first car to be used for strictly commercial purposes in 1901 for Smith & Murray's department store, Springfield, Mass. As far as can be learned, it was the first gasoline commercial automobile ever made in the United States. The accompanying illustration shows its design. It was of the three-wheel type with the single wheel in front, and was used for light parcel delivery only. Six machines of this model were sold during the 1901 season. However, the next year a larger four-wheel truck was brought out. This sold better, but still business firms hesitated about taking the motor truck seriously. By 1904 a 2-ton model had been designed. This was the first model to sell at all readily. From this point there was a steady improvement, both in truck design and truck sales, until in 1907 the Knox company was building 2, 3, 4 and 5-ton models, equipped with motors ranging from 20 to 50-horsepower. Since that time the factory has been unable to keep pace with orders, although the truck department has been enlarged several times. Only a year ago 40,000 square feet of floor space were added, enabling the company to double its output; and still orders are received faster than the factory can turn them out. An average weekly output for 1911 is shown in the illustration.

The first Knox gasoline commercial automobile, built in 1901 for a Springfield (Mass.) department store.

McCORD PROGRESS.

The McCord Manufacturing Company of Detroit, has acquired the materials, patents and good will of the Precision Appliance Company, of Chicago, and will hereafter manufacture the various well known types of Hill-Precision lubricators and oiling devices heretofore manufactured by that company, in connection with the McCord lubricators. This gives the company a complete line of mechanical lubricators of all types.

The McCord company now also is manufacturing a cellular radiator of approved design as well as its tubular type.

In order to provide room for increase in its business, the company has made an addition of 12,000 square feet to its factory building and 4,000 square feet to its foundry. This is still another sign of the healthy development of the motor wagon business, for the present and contemplated expansion must be well assured when the parts makers increase their manufacturing facilities.

POLACK TIRE EXHIBITS.

Polack tires will be exhibited at all of the national shows in the space of the Pennsylvania Rubber Company, by which concern they are manufactured. They are sold by the Polack Tire Company.

These tires are molded on a steel band which forms the base of the tire. It is mounted securely on the wheel by hydraulic pressure, so that there is no possibility of the tire loosening or chafing on the rim.

Polack tires are made under sole license of B. Polack, A-G. of Waltershausen, Germany, and are the same in every detail as the tires made there since 1903, which have attained a world-wide reputation. During the first year of their manufacture in the United States they have fully maintained their high reputation for wearing qualities and have been adopted as standard equipment by many of the foremost firms now operating motor trucks.

Polack tires are guaranteed for 8,000 to 10,000 miles' service according to load and road conditions. In nearly all cases they have surpassed the guarantee in service—many of them being in good condition after more than a year's use.

They are made in all sizes to carry loads up to 12 tons. After January 1, 1912, motor truck makers will be supplied with sizes to fit the new S. A. E. standard wheels.

St. Louis has purchased two motor ambulances.

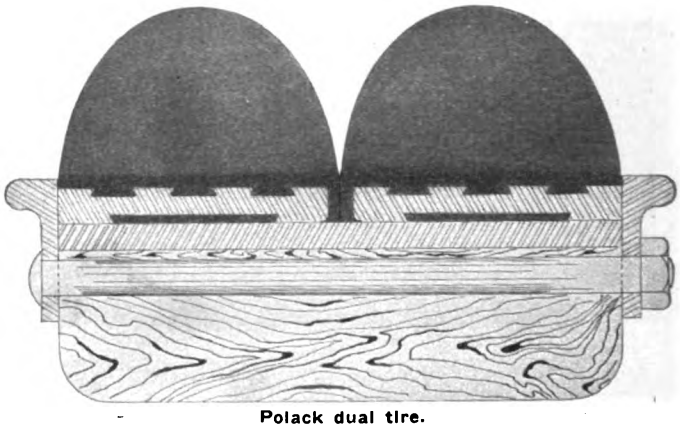
COVERT AT GARDEN SHOW.

The exhibit of the Covert Motor Vehicle Company, Lockport, N. Y., builders of the Covert selective type transmission, at the Madison Square Garden Show, is that of the leading exponent of a transmission carried on the rear axle.

In the past year the Covert company has specialized in transmissions and now its entire plant is given up to their production. While the Covert company produces transmissions of any type desired—as a part of a unit power plant or to be carried forward in the usual manner—the distinctive Covert transmission of the type noted—has become especially popular.

It was upwards of 14 years ago that B. V. Covert designed and exhibited for the first time a transmission of this type. It has since become very popular. It is claimed that the normal weight of the car is more evenly divided as the weight of the entire power plant comes on the front wheels and that of the transmission plant on the rear wheels with the Covert type. Better traction is afforded the rear wheels; thus the power is utilized with a minimum of loss.

Again, these transmissions give more nearly a straight line drive in actual service. They eliminate one universal joint, and the gears shift more easily through the long shifting roads, giving more of an end thrust instead of a side thrust. Any distortion of the frame does not affect the alinement of the shafts in the transmission.



Polack dual tire.

The gears are all nickel steel, carbonized, heat treated and ground to fit the shafts and receive bearings. The shafts are nickel steel, heat treated and ground to limits of one-half thousandth. The compactly designed case is made of light malleable iron castings of exceptional toughness and strength.

The design is such that vibration is practically eliminated and noise reduced to a minimum. The transmission is made in four sizes, from 20 to 50 horsepower, for both motor wagons and automobiles.

The Mitchell-Lewis Motor Company, of Racine, Wis., is making a light motor delivery car and a general utility motor wagon for farm use.

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BESSEMER

The mere fact that this mark is on our cars is evidence that they have a value that we consider worthy of your consideration.

We will exhibit our 2000 lb. Motor Truck at the Chicago Feb. 5-10 and Pittsburgh Feb. 17-22 Shows

Bessemer Quality Needs No Explanations

Features:

LONG STROKE MOTOR

BOSCH MAGNETO

RADIATOR—Spring Suspension

NICKEL STEEL GEARS in Transmission Face of Gears $1\frac{5}{8}$"

PRESSED STEEL FRAME

NICKEL STEEL SPINDLES on Axles

PLATFORM SPRINGS in Rear

WHEEL BASE 106"

TURNING RADIUS 33 feet

Specifications:

MOTOR—4 Cyl.—Water Cooled—$3\frac{3}{4}$" Bore—$5\frac{1}{4}$" Stroke—Schebler Carbureter

IGNITION—Bosch High Tension Magneto

TRANSMISSION—Selective—3 Speeds Forward and Reverse

CLUTCH—Cone—110 sq." Friction Surface

DRIVE—Double Chain

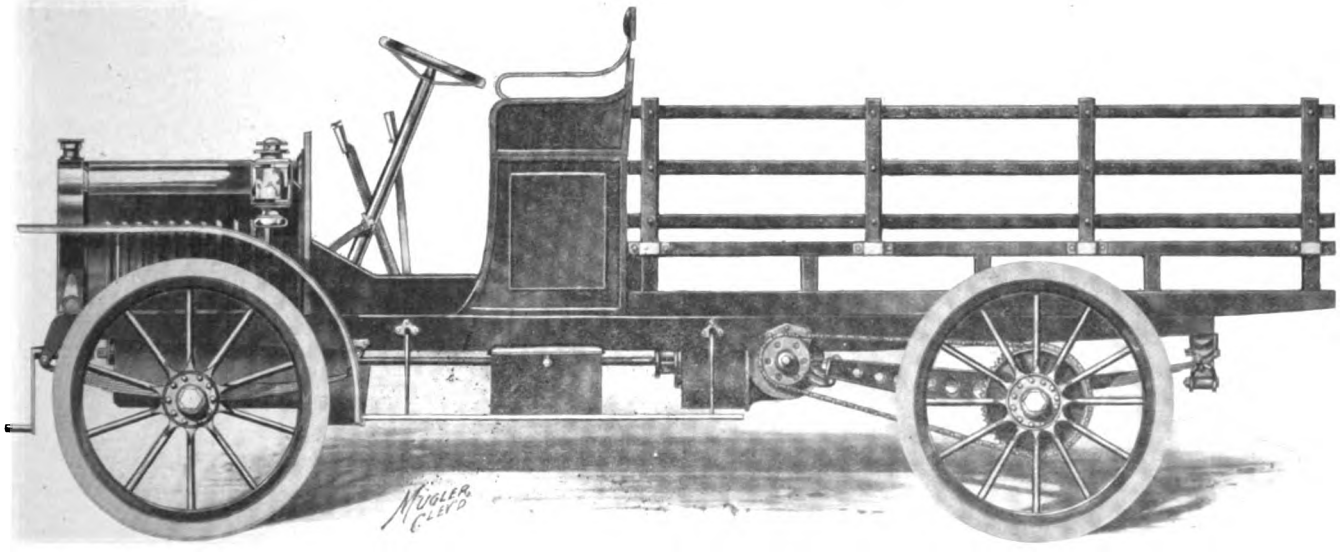
AXLES—Front—I Beam—Nickel Steel Spindle, $1\frac{11}{16}$" Diam.—Rear Drop Forge, $1\frac{3}{4}$" x $2\frac{3}{4}$"—Nickel Steel Spindle, $1\frac{5}{8}$" Diam.

BRAKES—Rear Axle Internal Expanding, $13\frac{5}{8}$" x $2\frac{3}{4}$"—External Contracting, 14" x $2\frac{1}{2}$"

WHEELS—Front, 34" x 3"—Rear, 34" x $3\frac{1}{2}$" Diamond

EQUIPMENT—3 Lamps—Horn—Tools

PRICE—$1,950 F. O. B. Factory



BESSEMER MOTOR TRUCK CO.

GROVE CITY, PA.

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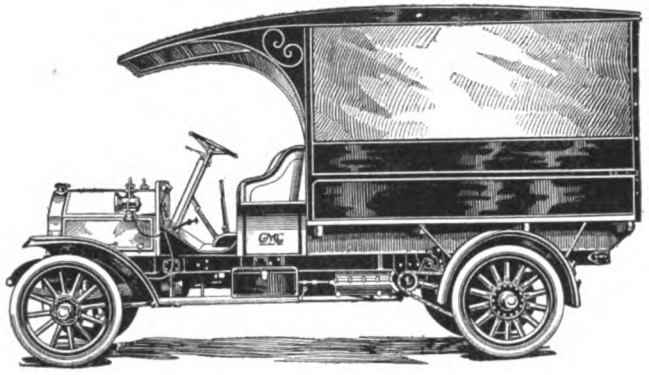
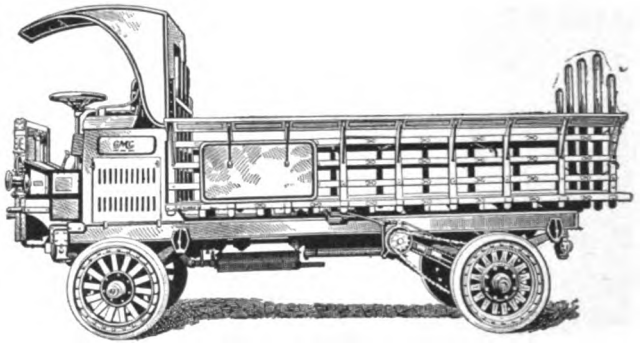
At the Madison Square Show

New York, January 15-20

and at the Chicago and Boston Shows



PANEL BODY
Model V—1 Ton Capacity, Price, Chassis Only, $2300



BREWERY BODY
Model K—5 Ton Capacity, Price, Chassis only, $4400

The prospective buyer of motor trucks cannot afford to consider a truck apart from the company that makes and sells it. If he is to get the maximum number of years' use from a truck—if he is to get the highest efficiency and the greatest economy in operation during those years—after the purchase must come service.

The G M C is the mark, not of a car, but of a company. G M C trucks have behind them the manufacturing facilities, the engineering and operating experience, and the financial permanence of the General Motors Truck Company—your banker will tell you what that means.

G M C service is a distinct department of the organization under a General Service Manager. The policy of this Service Department will be to insure to the purchaser a prompt service at times of emergency—in parts, personal assistance and co-operation.

Where it is desired, a special service will be rendered, before a sale is made, in a thorough analysis and study of any delivery or hauling requirements.

If you would build up a standardized delivery system, and have each truck a harmonious unit in the whole, select trucks built by a manufacturer who will be able to fill your future as well as your present requirements.

The G M C line includes gasoline and electric trucks in capacities of 1000 pounds to 6 tons.

Inspection of our exhibits at the New York, Chicago and Boston Commercial Car Shows is invited, as is correspondence from prospective purchasers and dealers.

GENERAL MOTORS TRUCK COMPANY

DETROIT, MICHIGAN

Branches: New York, Chicago, Boston, Philadelphia, Kansas City, Detroit

Please mention the "Power Wagon" when writing to advertisers.

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KNOX BREWERY MACHINES.

While the Knox Automobile Company built several vehicles for the brewery trade as early as 1902, this concern made its first serious bid for the business in 1905. The brewery motor wagon designed in this year by the Knox company was of 1½ tons capacity and fitted with a two-cylinder, double-opposed, air-cooled motor of 16 horsepower, and planetary two-speed transmission.

Many machines of this type are still in daily service doing their share of work regardless of the weather alongside of their more modern brothers.

As an example of how well many of these old motor wagons performed their task the following figures, taken from a letter sent in by a customer several years ago, tell an interesting story:

Cost of operating a Knox 16 hp. gasoline truck in service 11½ months:

Mileage, 8,000.

Days running, 264.

Holidays, days laid off on account of sickness of driver, for repairs, and for storage in stable when not needed, 31 days.

Gasoline consumed, 1,190 gallons.

Cost of gasoline, $204.30.

Cost of all repairs, including tires and insurance, $224.50.

Miscellaneous petty cash, being for overtime, supper money for driver, etc., $58.00.

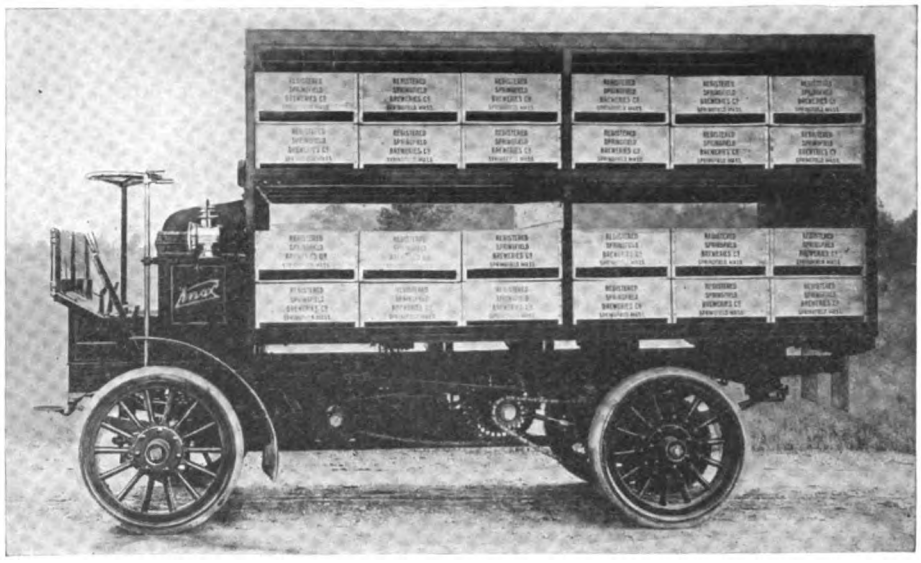
Wages, $885.00.

Oil (4 months as previous to that time oil having been included in gasoline account), $9.80.

Total for all, $1,381.60. This is an average of $115.33 per month.

The above figures were taken from the second year's running of the truck in order to include tire repairs and thus get a more correct average.

Many other cases show results even better than this, but the instance cited is a very fair sample of the average results obtainable as regards cost of upkeep only. This particular concern also experienced a very marked increase in its gross receipts immediately following the installation of the machine, a result which can be attributed to nothing else than the advertising feature of the machine, combined with prompter deliveries and larger radius of action.



An early Knox motor wagon, loaded with case goods, in the service of a Springfield (Mass.) brewery company.

As an instance of what motor wagons are able to do today in the way of serving the brewery trade, the following figures, furnished by the Springfield Breweries Company of Springfield, Mass., are adduced. The machine referred to is of three tons capacity with four cylinder motor of 40 hp., A. L. A. M. rating. It is used on a route embracing several steep and long hills as well as many rough sections of roads; yet it has done the work of two teams with five horses ever since it was put in operation, besides doing away with one driver and one extra helper.

In making a comparison of the saving effected on the former horse outfit, it is interesting to cite a definite case of delivery between two points situated about nine miles apart. When the horse teams were used it was found impractical to make the complete trip over the road so the two teams delivered the barrels of beer at the railroad freight house, a distance of about two miles from the brewery, and the remainder of the distance was made by rail.

In the figures no account is made of the charge for hauling to the saloons at the other end as should properly be done, inasmuch as the motor wagon carried the shipment right through to its destination without rehandling.

The following are the tabulated results secured from each method:

With horses:	
Depreciation, interest and insurance	$ 2.36
Labor	2.77
Freight (loaded)	10.94
Freight (empty; returning barrels)	9.73
Total	$25.80
Total number of half-barrels moved in one day	128
Cost per half-barrel	.20
With Knox motor wagon:	
Depreciation, interest, insurance and garage	$ 3.76
Tires	1.66
Labor	3.41
Gasoline	1.98
Oil	.20
Total	$11.01
Total number of half-barrels moved in one day	128
Cost per half-barrel	$0.8½

This machine makes on an average 75 miles a day, loaded most of the time, as it carries loaded or empty beer barrels both ways, and for five months its total cost for repairs did not exceed $50.00.

Besides the actual saving of 11½ cents a barrel on cost of delivering, the empty barrels were returned to the brewery prompter and in better condition.

Heavy duty Knox machine in brewery service.

The Warner Manufacturing Company has made additions to its plant which will enable the yearly production to be increased to 40,000 sliding gear transmissions and 40,000 steering gears.

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New motor wagon shops of the Packard Motor Car Company, Detroit, Mich., in course of erection.

PACKARD SHOP ADDITION.

The motor wagon business of the Packard Motor Car Company has increased so rapidly that this concern has begun the erection of two new buildings which will be finished early in January and will be devoted entirely to the manufacture of motor trucks. The new shops will give the truck division a normal capacity of five machines a day. Each of the new factories is practically a duplicate of the original motor wagon plant which appears in the background of the illustration. These structures mark one end of the Packard plant which stretches away three-quarters of a mile to the north. Next to the truck shops are the two service buildings, recently enlarged by the addition of a third floor.

The factory proper, office building, heat treatment, sheet metal and wood working shops are grouped north of the boulevard, with the foundry and forge somewhat removed. The recent additions, together with the power plant and the two service buildings, are on the south side of the boulevard. There are, in all, 30 buildings and 37 acres of floor space.

RUSSELL JOINS A. L. CO.

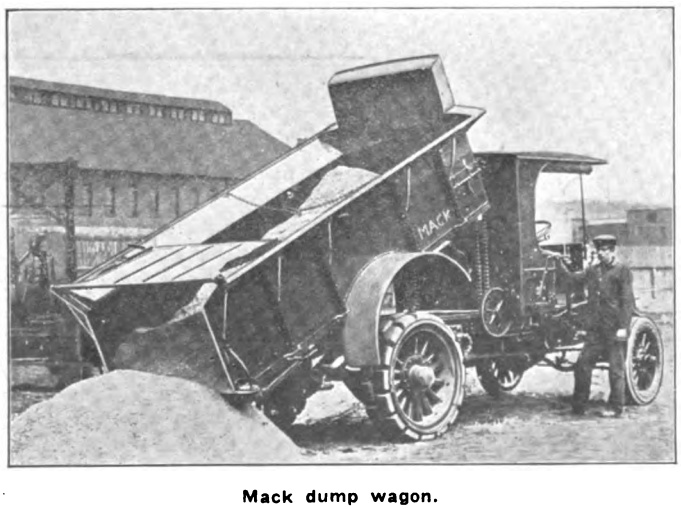
The appointment is announced of Robert F. Russell as assistant engineer of the automobile department of the American Locomotive Company.

Mr. Russell comes to the Alco engineering staff from the Simplex company, where for seven years he was in charge of the designing department. He is prominent in the engineering world and is considered an authority on both motor truck and car design.

In his new capacity he will be associated with Montague H. Roberts, chief engineer, in matters pertaining to Alco trucks and cars.

NEW DUMP WAGON.

The illustration shows one of the latest types of motor wagon with dump body attached. The chassis is the regular "Mack" type, with the wheelbase varying according to the size of body desired.

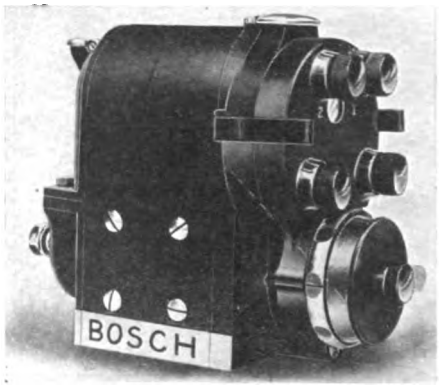


Mack dump wagon.

The hoisting device is mounted on special braces fitted to the back of the cab, and the mechanism is operated by means of a transverse shaft mounted directly beneath and in the same plane as the upper cross shaft. The lower shaft is driven from a small countershaft, situated in the transmission, by means of worm and worm wheel, and this small shaft is in turn operated by a sliding spur gear, which meshes with the second speed gear on the main transmission countershaft, when the hoist is to be used.

To raise the body, first gear is engaged, the clutch let in, and the body starts on its upward travel. When it is in its extreme upward position, the clutch is automatically thrown out by means of a stop on the hoisting chain, which prevents the lifting arms being drawn over center. To lower the body, reverse is engaged and the clutch let in. This brings the body back to its original position, and the clutch is thrown out automatically, as in the upward movement. This prevents the body coming down hard against the chassis frame.

The tailgate can be operated either automatically or by hand. The spur gear, which operates the worm shaft, is thrown in mesh with the second speed gear on the countershaft, by means of a small lever, situated close to the gear shift quadrant, and when in the forward position, prevents the gear shift lever from being placed in any but first or reverse speed, which are the two speeds for operating the hoist. When the gear is thrown in mesh, the driving dog for the main countershaft gear is thrown out, which makes it impossible to move the motor wagon while the body is being raised. The body can, however, be stopped at any desired position, and the machine driven over the road, without the body being drawn back to its original position.



Bosch "Z" type magneto.

BOSCH SHOW EXHIBIT.

One of the features of the ignition exhibits at the Madison Square Garden Show will be the Bosch stand No. 218, where a complete range of all types and sizes of Bosch magnetos and ignition systems will be displayed.

The exhibit, which will be the most representative one of Bosch products, includes those types of magnetos as fitted to 1912 motor wagons, as well as those for equipment to the 1913 products which make their appearance on the market during the mid-summer. On the latter mentioned types it will be observed that the Bosch Company has concentrated its attention on rendering the newer types which are technically designated "Z" types, waterproof and dustproof.

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DOOLITTLE LEAVES KNOX.

We have received the following communication from the Knox Automobile Company, of Springfield, Mass.:

"Albert H. Doolittle, advertising and publicity manager of the Knox Automobile Company, has resigned his position to take effect the first of the year. Mr. Doolittle is well known to the trade through his long practical automobile experience which has taken him through every step of motor car manufacture, distribution and advertising, so that his new venture as a specialist in this class of publicity will be followed with interest."

Evidently Mr. Doolittle is going into the general publicity business for automobiles. We wish him success in his new undertaking.

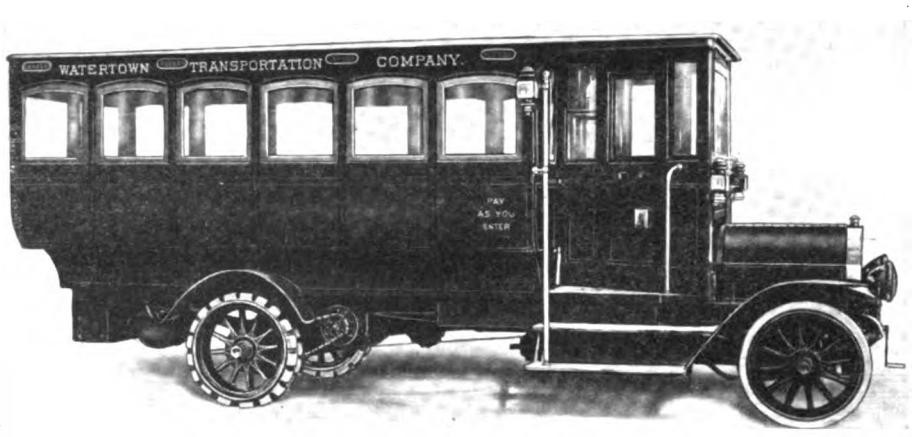
The Detroit Taxicab Company recently ordered ten 2-ton Kelly motor truck chasses to be used for taxicabs and motor buses.

GOOD RECORD BY COMMERS.

The coal concern of H. L. Herbert & Company, of New York, recently made a fine record with its Commer motor wagons. Three of these machines performed the remarkable feat of delivering into the Hotel Belmont no less than 240 tons of coal from the Herbert coal yards in one day. The three Commers made 33 trips during the day, one of the machines accounting for 94½ tons out of the total.

These three Commers during the first 19 days of December delivered 2,700 tons of coal. This included long and short hauls and covered the period of the recent heavy snowfall with its attendant crippling of horse deliveries.

The recent purchase of five additional 6½ ton Commer trucks by H. L. Herbert & Company of New York from Wyckoff, Church & Partridge, Inc., New York City, is added proof that the great economy of Commer trucking over horses is an established fact, and that they are convinced that prompt service to their customers is a prime essential in the selling of coal.



Knox motor bus.

WATERTOWN'S MOTOR BUSES.

The splendid motor bus shown in the illustration has just made its appearance on the streets of Watertown, N. Y., where a considerable number of them have been installed to compete with the street cars. They are to run in the exclusive residential section and look more like private limousines than public vehicles, although limited to carry 28 passengers.

The men operating the line gave the Knox Automobile Company carte-blanche to produce the finest thing possible and the result is the culmination of the experience of the engineers and designers of this well known automobile manufacturing concern.

The driver is conductor and motorman in one. He occupies a separate vestibule, in the door of which is a fare-box and change window. The operation of the main door is controlled by means of a lever reaching to the driver's seat.

The buses are heated by leading the water from the motor through pipes under the seats instead of through the radiator. The temperature inside may be regulated by the driver.

Push buttons operate buzzers which notify when a passenger wishes to stop. There is also installed a complete electric lighting system which may be controlled by the driver without leaving his seat.

ALCO SHOW EXHIBITS.

Plans have been made by the American Locomotive Company to exhibit Alco motor trucks widely at the coming shows

Manager of Sales Harry S. Houpt announces that space has been reserved at the leading shows of this country and Canada.

In New York, at Madison Square Garden, the exhibit includes a 5 ton truck with a coal dumping body, a 2 ton model designed for brewery service and a 3½ ton chassis.

The Alco will be displayed also in Chicago, Pittsburg, Milwaukee, Minneapolis, Scranton, Providence, Hartford, Philadelphia, Boston, Montreal and Toronto.

NEW TIRE GRIP.

Announcement is made by the Atlas Chain Company, Bush Terminal No. 4, Brooklyn, N. Y., that on January 15, 1912, the company will commence delivery of a new motor wagon tire grip, manufactured exclusively for use on solid tires. This company has heretofore confined itself solely to the manufacture of chain grips for use on pneumatic tires.

The Wilmington motor fire engine, by a record run, recently saved the village of Talleyville, Del., from destruction by fire.

A fleet of three Commer motor wagons now in use by H. L. Herbert & Company, coal dealers, of New York, and purchased from Wyckoff, Church & Partridge, Inc., New York City.

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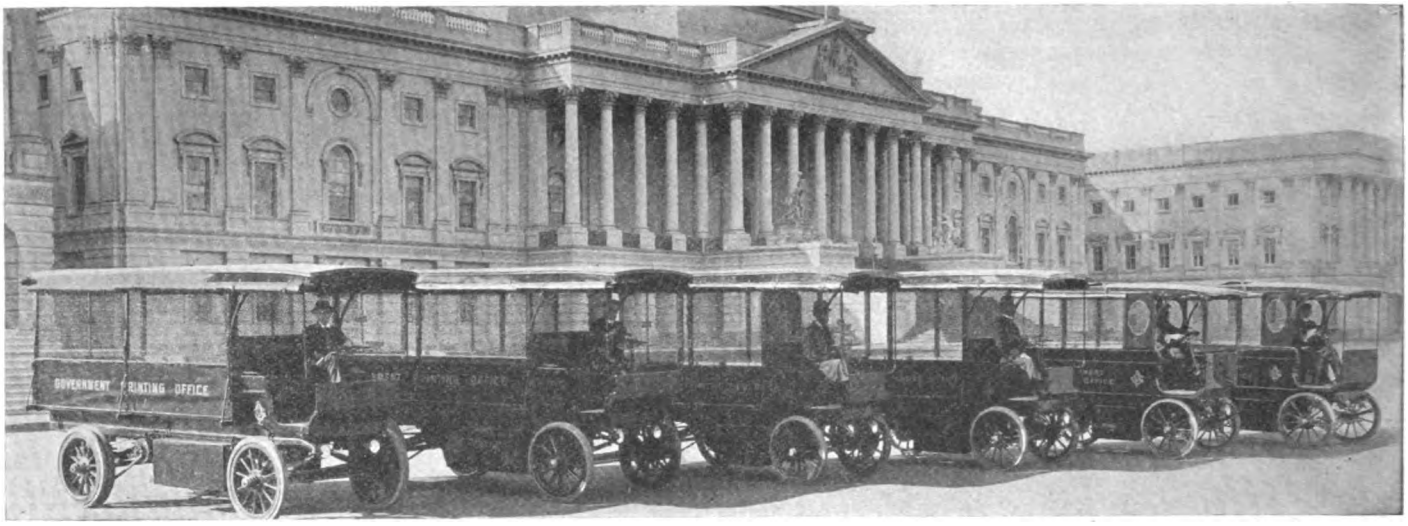


Installation of 6 Baker electric wagons, comprising 2 heavy trucks, 2 light trucks, and 2 delivery wagons, recently put into the service of the Government Printing Office at Washington, D. C.

ELECTRICS IN U. S. OFFICE.

The United States government has just made an installation of electric trucks for the Government Printing Office—the first for that department. These machines will completely supplant the use of horses.

Six machines are to be used, including two delivery wagons, two light trucks and two heavy trucks, ranging from 1,000 to 3,000 pounds. They were made by the Baker Motor Vehicle Company of Cleveland. Electrics are also in use in the United States mail service and in the Department of Navy Yards and Docks.

This indorsement of the electric motor wagon by the government is significant. One important consideration in the purchase was the efficiency of electrics in city service. The continuous torque of the motor is well suited for frequent starting and stopping.

HOW TO USE POWER WAGONS.

By F. W. STEWART,
Buick Motor Co.

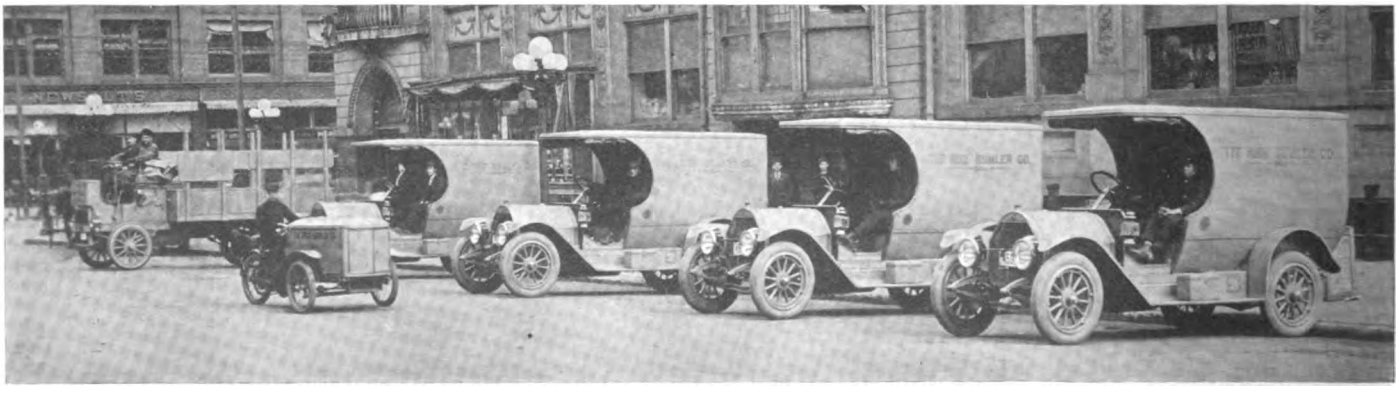
The proper method of figuring out a solution of the average delivery business is to have a sufficient number of motor wagons in operation so that in event of one being out of commission the entire delivery service is not disturbed. By adding a little additional work to all the others the business may be handled without any inconvenience. Light, quick, medium weight motor wagons, equipped with pneumatic tires, will do the work of a great many horses with a considerable saving in all branches of the delivery system.

A feature which could be improved upon in the installation of motor wagons is a systematic method of operation whereby each and every one of the machines would be kept in motion the greatest possible percentage of the time. This could be done by means of interchangeable loading racks where for small parcel work these racks would be installed in the shipping room. The packages should be arranged in these racks in accordance with the route so that the package boy could pick each individual package exactly in accordance with his route, lose no time in handling an endless number of bundles, and hunting for one particular package.

When the rack is filled it could be handled readily and moved from the shipping room to the shipping platform by means of trucks, where there is no regular loading platform, or where there is a loading platform, these racks could be arranged on rollers and could be easily pushed from the shipping room directly into the wagon, and in this manner eliminate the waiting of the machine for its load. In this manner the driver and package boy would be continually busy for their special line of work, and the motor wagon would never be idle for more than possibly ten minutes. By using this method the vehicle would be working at full capacity practically all the time, thus eliminating the rehandling of the packages, and minimizing breakages or losses.

These points, studied by the larger and better power wagon manufacturing companies, have been tested and proved practical, and if business men will put up their delivery proposition to these reputable companies and have them offer a systematic motor solution whereby the installation of a given number of machines would handle a given amount of work over a specified delivery zone with an estimated cost of operation, it is not difficult to figure out how the horse equipment can be retired and superseded by power wagons.

The Merchants' Motor Delivery Company has been incorporated with a capital of $25,000 by A. W. Harris, W. Hahn and A. H. Fernwalt, to do a motor express and transfer business in Fort Wayne, Ind.



The motor delivery wagons of a Dayton (Ohio) department store. These machines are all equipped with the Apico Model A3 electric lighting system.

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(Continued from p. 64.)

through an exceptionally large transmission, with wide faced sprockets and liberally proportioned chains and roller bearings make for the minimum wear on the motor and transmission parts, thus resulting in maximum economy in service.

The low center of gravity, making possible a nearly straight line drive results in minimizing the strains on the torsion rods, chains, etc.

Details of design are fully given in the specification tables in this issue.

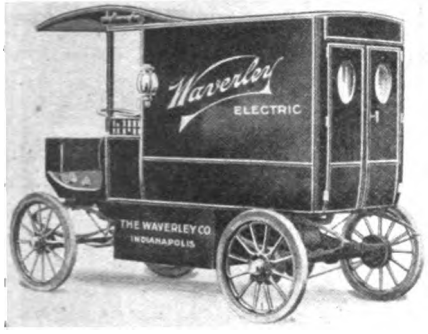
* * *

Pierce-Arrow Motor Car Co., Buffalo.

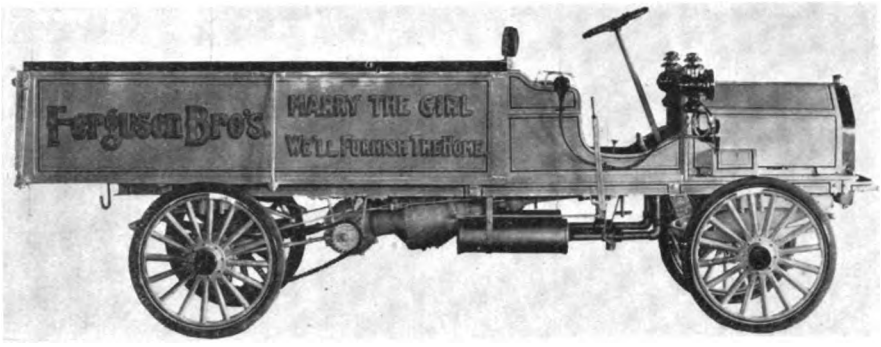
This concern makes a 5 ton gasoline motor wagon. This machine is of the type with the motor in front of the dash, and the driver directly behind. The control is practically the same as is used in Pierce-Arrow touring cars. The company has, in its experience, found this arrangement to be greatly preferable to placing the driver over the motor.

The rear wheels are located very nearly in the center of the length of the platform, thus placing practically the entire load on the rear wheels, this being the European practice. With the weight thus distributed the traction is much more positive and the problem of the tires is taken care of by making these sufficiently large to carry the load; increased braking ability is afforded as the rear wheels are not so susceptible to being locked and skidding is not so liable to occur.

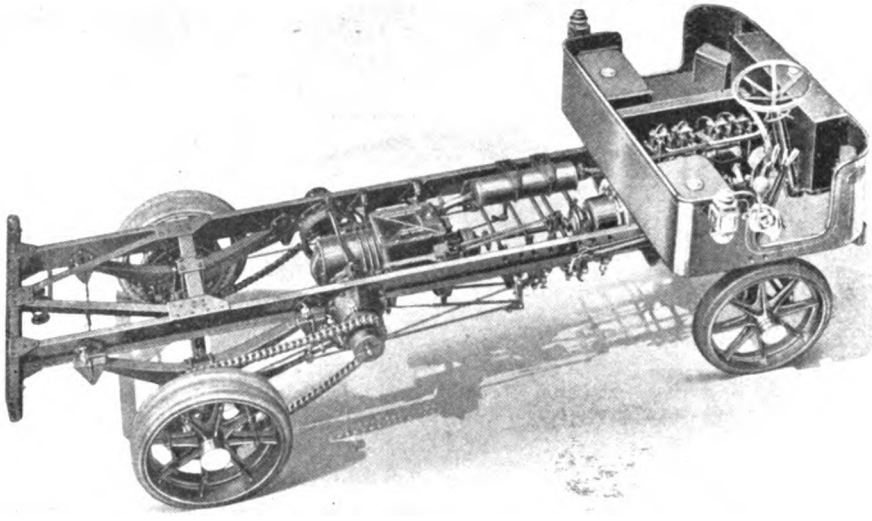
Details of design are fully given in the specification tables in this issue.



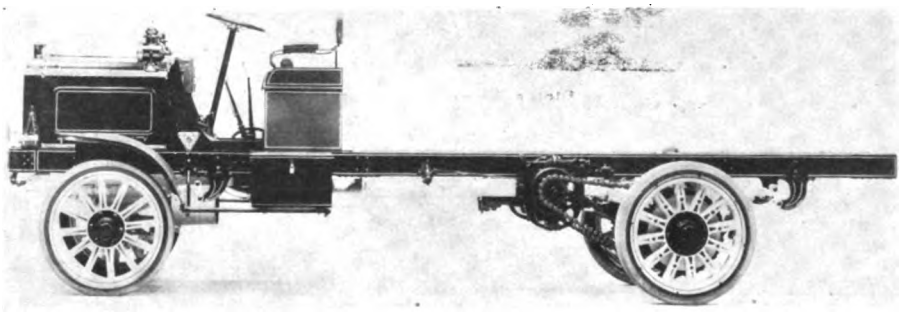
Waverley electric wagon.



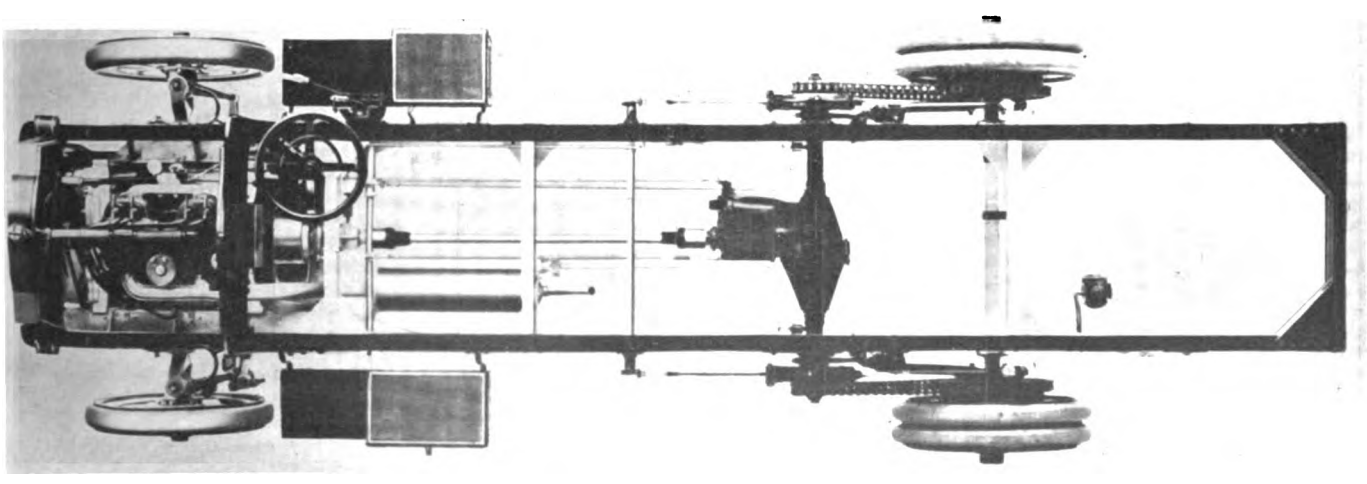
McIntyre Model XIV.



Morgan 3-ton chassis.



Packard 3-ton chassis.



Plan of Packard 3-ton chassis.

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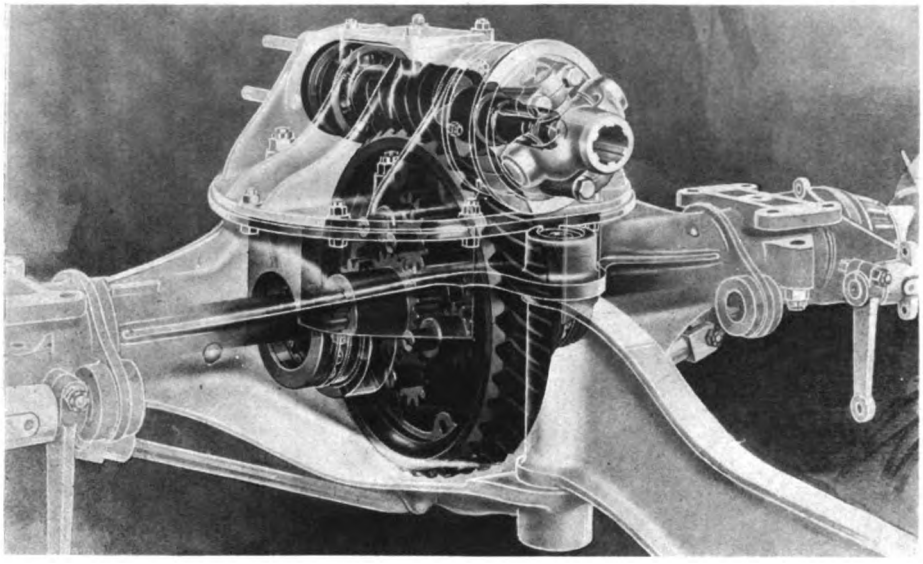
Pierce-Arrow 5-ton power wagon.



Phantom view of Pierce-Arrow 5-ton truck worm-driven axle.

Pope Mfg. Co., Hartford, Conn.

This concern makes a 3 ton gasoline motor wagon, besides specializing in public service machines, including combination chemical and hose wagons, flying squadron wagons, salvage corps wagons, fire patrol wagons, chiefs' wagons, hose wagons, police patrols, ambulances and busses.

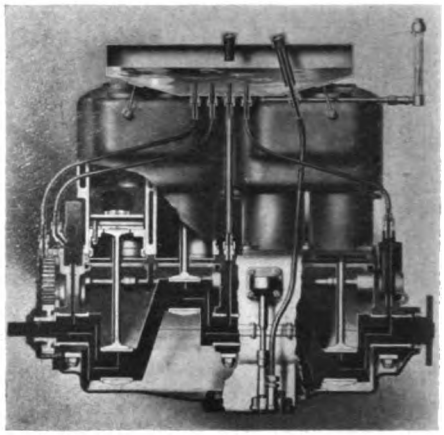
Details of design are fully given in the specification tables in this issue.

Details of equipment may be obtained from the company.

* * *

Randolph Motor Car Co., Flint, Mich.

This concern now specializes in a 1 ton



Oiling system of Pierce-Arrow 5-ton truck motor.

gasoline motor wagon, having discontinued the manufacture of other models.

Many types of bodies are made to fit the chassis of this model, including interchangeable freight and passenger bodies.

Details of design are fully given in the specification tables in this issue.

* * *

Reo Motor Truck Co., Lansing, Mich.

This concern (the general sales agent is

Pierce-Arrow 5-ton truck with special coal dumping body which is particularly useful for unloading coal near the sidewalk level, while the chutes at the side provide for high-level unloading.

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R. M. Owen & Co.) makes light delivery gasoline motor wagons of 1,500 pounds maximum load capacity.

Details of design are fully given in the specification tables in this issue.

* * *

Alden Sampson Mfg. Co., Detroit.

This concern makes a very complete line of gasoline motor wagons, including models of the following load ratings: 1,000 pounds, 1½ tons, 3 tons, 5 tons.

The following special features of Sampson motor wagons are specialized for one's attention by the makers:

"Cases for chain-driven trucks—long life; economy.

"Differential lock—pulls truck out of holes and slippery places.

"Gear shifting interlock—prevents abuse to gears; safety.

"Immediate accessibility of parts—simplicity.

"Unusual strength of all parts—long life.

"Unusually large wearing surfaces—long life.

"Motor specially designed in Sampson factory.

"Lubrication automatic and thorough.

"Suspension of motor and radiator on heavy spiral springs—long life.

"Detachable hubs on wheels allowing quick change of seasonal equipment.

"All gearing and bearing surfaces dust and moisture proof.

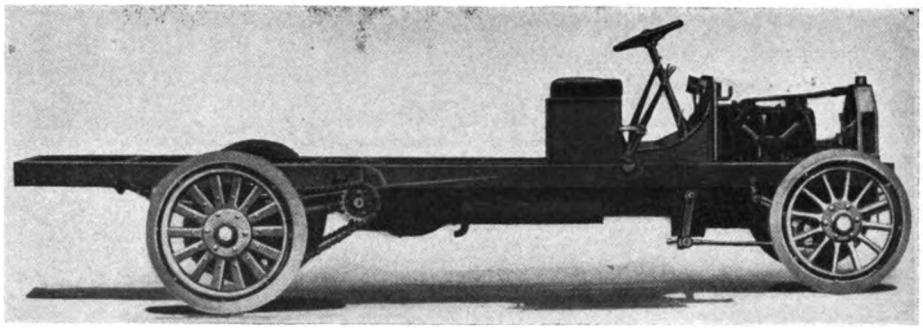
"Fish-belly frames, preventing sag—long life.

"Gear change and differential units mounted on three-point suspension—long life.

"Rear spiral auxiliary springs—minimize vibration; long life.

"Unusually large bearings—long life; economy.

"Brakes quick-acting and powerful—safety."



Chassis of Peerless power wagon.

Pope Hartford 3-ton motor wagon.

Details of design are fully given in the specification tables in this issue.

* * *

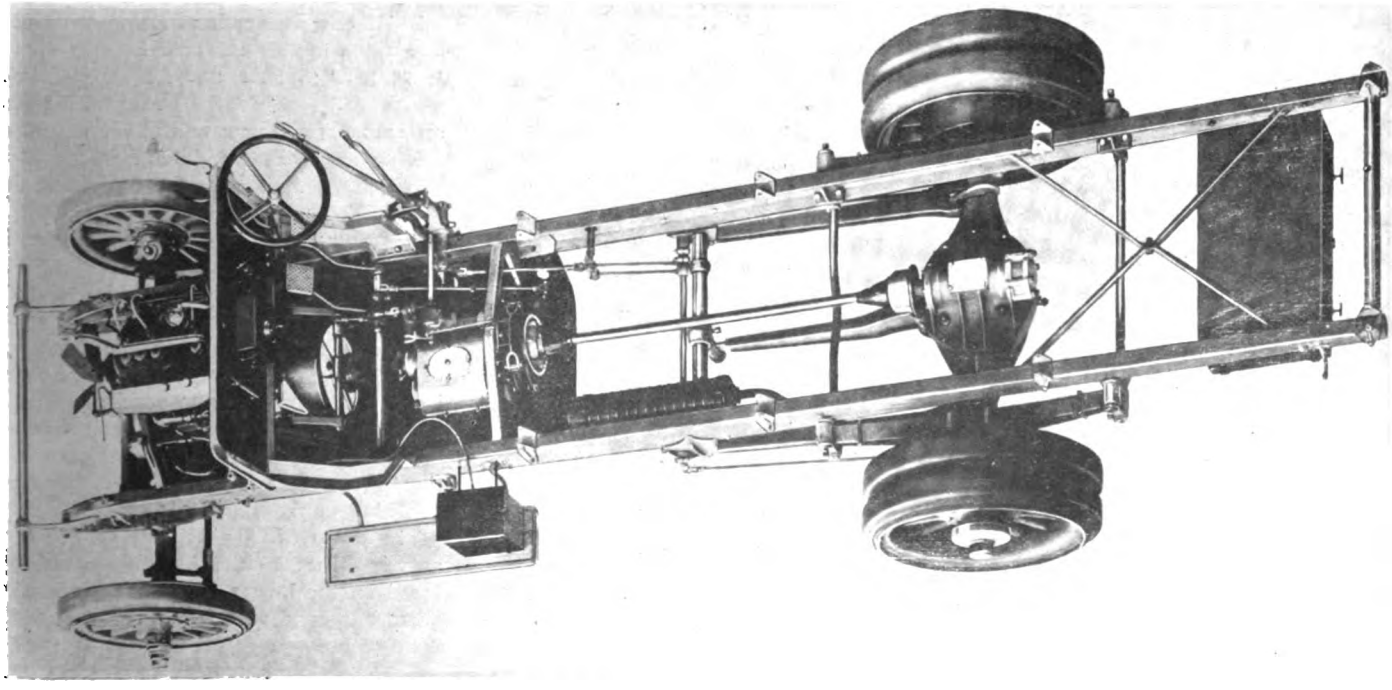
Speedwell Motor Car Co., Dayton, O.

This concern makes 4 and 6 ton capacity gasoline motor wagons, besides motor patrols and motor ambulances.

Many special bodies are made to fit these chasses, including a coal dump body with two chutes.

The 4 ton machine, the standard wheelbase for which is 115 inches, is also made with a long wheelbase of 139 inches.

A power winch driven off the counter-



Chassis of the Pierce-Arrow 5-ton truck, showing absence of gusset plates, a potent factor in the flexibility of the frame construction.

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Sampson 4-ton model.

Sampson 1,000-pound delivery wagon with screen body.

Sampson 3,000-pound model.

shaft of the transmission is also provided by the company for attachment to its models, when desired.

Details of chassis design are fully given in the specification tables in this issue.

* * *

F. B. Stearns Co., Cleveland, O.

This concern makes a 5 ton gasoline motor wagon. Among its special features is the carrying of the power plant and the driver's seat on a sub-frame hung on semi-elliptic springs, thus taking all the road strains away from the motor.

Details of design are fully given in the specification tables in this issue.

Randolph 1-ton motor wagon.

Ward Motor Vehicle Co., N. Y. City.

This concern, which since January 1, 1911, has been the successor of the Pittsburgh Motor Vehicle Company, specializes in electric motor wagons. The following are the load capacities of the various models: 600, 800, 1,300, 2,000 and 3,400 pounds—all with 33 per cent stated overload capacity.

Interchangeability of parts is the feature of the Ward machines, which are guaranteed for one year.

Details of design are fully given in the specification tables in this issue.

* * *

Waverley Co., Indianapolis.

This concern makes electric wagons. The following are the load capacities: 600, 1,000, 1,200 to 1,500, 2,000, 2,500 pounds, 2 tons and 3 tons. Various styles of bodies are made. The company also manufactures electric ambulances and hearses.

Details of design are fully given in the specification tables in this issue.

A feature of this company's service is the Waverley Maintenance Contract.

This contract covers the entire cost of maintaining, charging and operating an electric motor wagon, with the exception of the driver's wages, the cost of re-painting and of repairs due to accidents. It includes in addition a maintenance guarantee continuing for three years, a guarantee that the wagon is to be in good operating condition at the expiration of that period.

The terms of this contract of necessity vary in different cities, but they are always based on the lowest obtainable figures for current, garage rent and labor, hence the maintenance contract is strongly recom-

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mended for the owner who is not prepared to garage his own car.

MAINTENANCE CONTRACT.

....., 191..

"It is further understood and agreed that .....will store the above car, attend to the washing of same, charging batteries to meet your requirements, and keep wagon in good repair in every respect, repairing tires or furnishing and putting on new tires, maintain the batteries, washing and renewing same when necessary, for the sum of $..... per month, provided, said repairs are not the result of accident or neglect.

"The above maintenance charge not to include repainting. This contract to cover a period of three years from date of delivery with the understanding that .... is to have the benefit of any reduction in the upkeep charges on same type of car during the life of this contract.

"At the termination of this contract the wagon is to be in good operating condition.

Signed ....."

* * *

White Company, Cleveland.

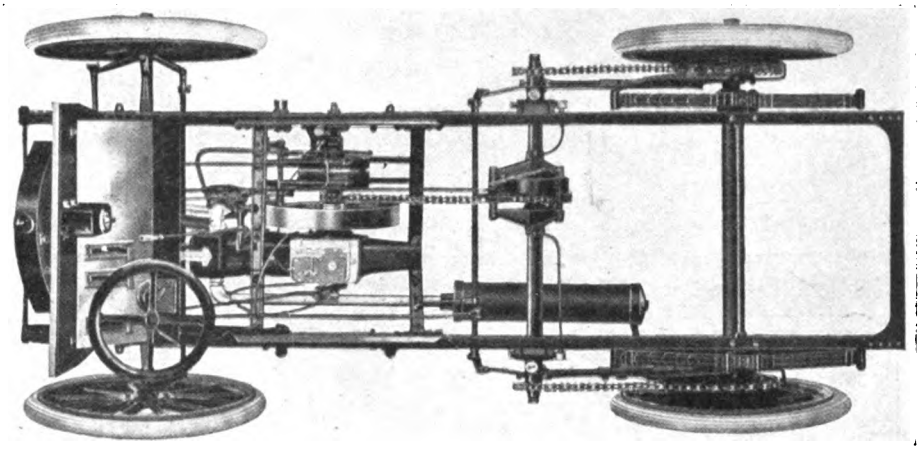
This company makes gasoline motor wagons of 1,500 pounds, 1½ tons and 3 tons capacity. Simplicity of motor and accessibility of parts are the chief features.

Details of design are given fully in the specification tables in this issue.

Sanford-Herbert motor wagon.

WORLD-WIDE INQUIRIES.

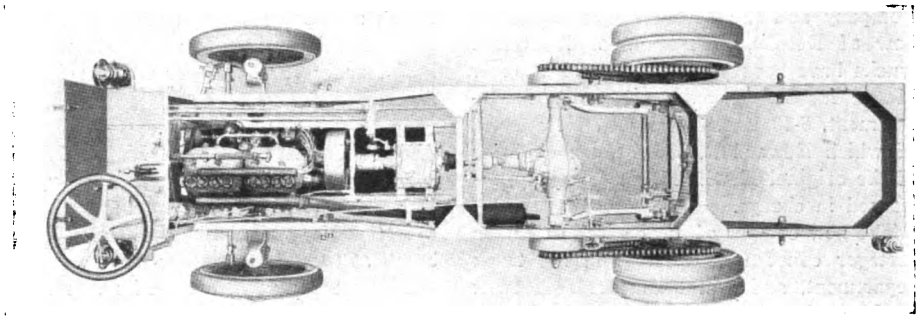
Not the least interesting inquiry just received in the foreign mail department of the Chase Motor Truck Company, of Syracuse, N. Y., was a request for complete information regarding Chase trucks from an American missionary in the far away city of Shantung, province of Pangkischuang, China, one of the greatest if least known portions of the Celestial Empire. The letter was written on October 28 and was forwarded to the home office from the Chase branch at Cleveland, Ohio. The missionary wrote that he never saw better roads anywhere than in his province and that he had just ordered a motorcycle and expected to be able to stand any kind of bouncing after the shaking he has long experienced in the Chinese springless cart.



Reo motor wagon chassis.

For use in his work, which takes him long distances and often requires the carrying of supplies, he wants a Chase truck, specifying a Model "D" express, which has a capacity of 1,500 pounds. To accommodate his roads the gauge of which is only about four feet, it would be necessary to make some considerable change. The missionary makes particular inquiry about the engine and its feasibility and is enthusiastic about the possibilities of a motor truck in his arduous labors.

Several other foreign letters just received by the Chase people reveal not only the broad interest being shown in the motor wagon field, but give an idea of its diversity as regards locality. Three letters from Moscow (Russia), Berlin (Germany), and Cintra (India), asked for Chase agency connections—not for the one city or province, but for the whole country. The Chase people also received a communication from their dealers in Auckland, New Zealand, under date of November 23, this letter being delivered in 25 days (December 18), which is remarkably quick time considering that New Zealand is on the opposite side of the world.

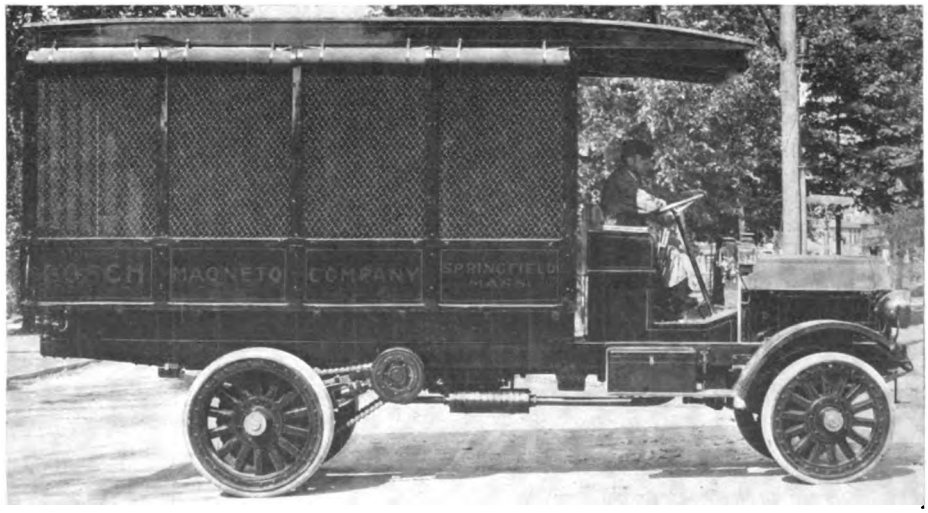


Speedwell 4-ton truck chassis.

HEWITT MOTOR COMPANY.

Papers have been filed at Albany for the incorporation of the Hewitt Motor Company, with offices in the Borough of Manhattan.

A glance at the old handbooks of the automobile trade will show that the original Hewitt Motor Company was one of the



Stearns 5-ton motor wagon.

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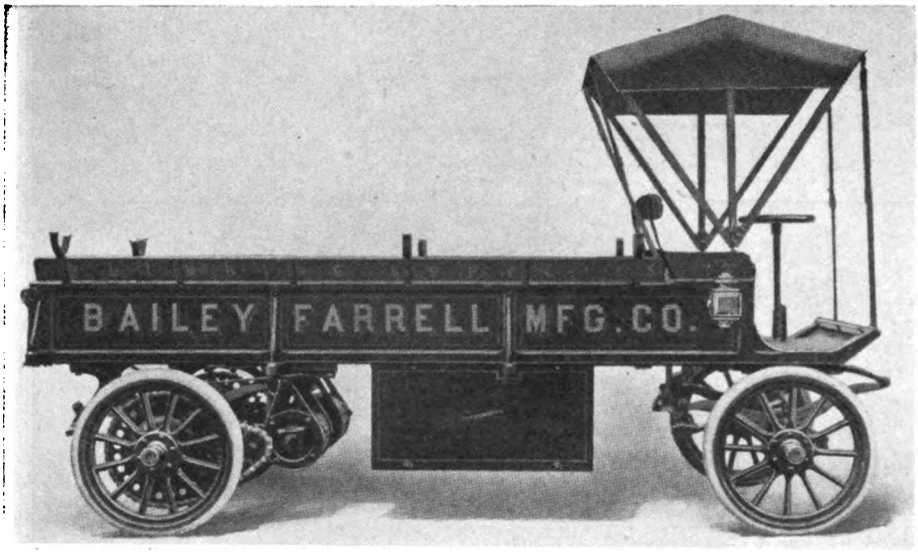

Ward Motor Vehicle Company's 3-ton electric wagon.

pioneers in the automobile industry, and especially in the commercial department, being one of the first in this country to produce light delivery wagons and heavy trucks.

In January, 1910, a combination was effected between the original Hewitt Motor Company and the Metzger Car Company, now of Detroit, Michigan, and Hewitt trucks have been produced by the Metzger Motor Car Company through its Truck Department, 6-10 East 31st street, New York, of which Edward R. Hewitt, the engineer of the original Hewitt Motor Company, remained in charge.

The new company has acquired from the Metzger concern its interest in the truck department, and will manufacture Hewitt trucks in its own new factory and service station at West End avenue and 64th street, as soon as the equipment shall have been installed—about January 15, 1912—and has placed Mr. Hewitt in entire charge of the engineering and construction of the Hewitt machines.

The directors of the new company are M. F. Burns, E. C. Converse, Wm. E. Corey, E. R. Hewitt and Ambrose Monel.

The company has an authorized capital of $1,000,000, one kind of stock only, no bonds.

NEW AGENCY TAKES 23.

The Chase Motor Truck Sales Company, of Minneapolis, Minn., has just taken the agency of the Chase Motor Truck Company, of Syracuse, N. Y. This new agency gets an unusually attractive territory which includes the entire state of Minnesota, also North and South Dakota and a small portion of Wisconsin. It starts off with an initial order for 23 motor wagons for immediate delivery.

SHOW EXHIBITS OF H. O. S. CO.

The Hydraulic Oil Storage Company, of Detroit, Mich., has an interesting exhibit at the New York shows and will also have a booth at the Chicago show next month.

This company will exhibit its various hydraulic systems for the storage of gasoline and oils. A typical garage system consisting of a storage tank, top feed draw-off and other essential parts will be shown. The operation of the system will be demonstrated with the aid of actual working models—exact replicas of the large size systems—and it will be shown conclusively that the hydraulic system is not only a convenient and efficient method of storing gasoline, but is absolutely safe and explosion-proof as well. The theory upon which the construction of this storage system is based is that pertaining to the difference in weight of gasoline and water. When these two fluids are confined in the hydraulic storage tank the gasoline, being lighter, floats on top of the water. The dividing line is clear and distinct. In order to draw gasoline the only operation necessary is the lifting of the lever of a water control valve. The lifting of this lever allows additional water to enter the tank, thus lifting the gasoline out through the top feed, the flow of gasoline ceasing the moment the valve is released.

Another feature of the exhibit is a coin-controlled machine for selling gasoline. To draw gasoline, one simply deposits a coin in the slot in the machine and trips a valve. The machine then automatically delivers one accurately measured gallon of gasoline for every coin thus inserted.

The company will also show a swinging-arm attachment designed for the delivery of gasoline direct from the storage tank to the tank on the machine, portable and floor tanks, a continuous flow meter that accurately measures in quarts or gallons, and a multiple delivery system, for factories. By this multiple delivery system, gasoline or oil can be delivered to any number of floors and through any number of draw-offs. It is a safe, efficient and practical method, can be economically installed, and is simple and positive in operation.

White garbage truck.

KENNEDY JOINS ALCO.

The American Locomotive Company is to be congratulated on having obtained W. P. Kennedy to take charge of its recently established transportation cost bureau in connection with the motor wagon department.

Mr. Kennedy is recognized as the leading transportation authority in America. He has been identified prominently with the motor wagon industry for twelve years.

"In establishing this cost bureau we are in a better position to analyze business hauling systems in a scientific way," says Mr. Houpt, manager of Alco sales.

"It is a fact that, while business men have accurate figures on manufacturing, selling, office, and other costs, probably less than 1 per cent know what their horses are costing them.

"The way to find out is to have experts analyze the particular situation with regard to horses. The result, made up in actual figures and diagrams, carries the desired evidence."

$5,000 A YEAR SAVING.

Sperry & Hutchinson, of New York, the trading stamp folks, found that by delivering straight to Brooklyn with a Packard truck they could eliminate their Brooklyn warehouse, thereby saving $2,000 rent and over $3,000 wages.

Driving chains may be cleaned in gasoline or kerosene, and when dry should be soaked in a heavy melted lubricant and finally treated with flaked graphite.

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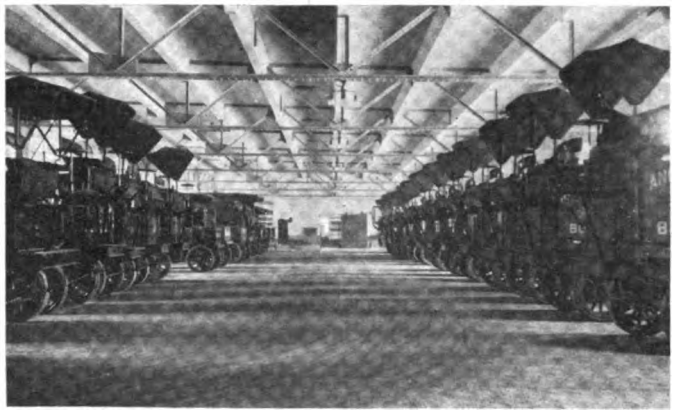
Big Power Wagon Fleet.

Interesting Particulars Concerning the Fleet of 60 Machines Used by the Anheuser-Busch Co., St. Louis.

FEW BUSINESS establishments are able to take fuller advantage of motor haulage and delivery than brewery companies, and so well have the latter realized this fact that there is not a single brewer of importance that does not use motor wagons to a considerable extent. For many years the principal brewers of this country have been superseding their horses in favor of motors, and results have been so favorable from the standpoint of both service and economy that the time is near at hand when practically the whole of this business will be on an all-motor basis.



West aisle of Anheuser-Busch garage showing motor wagons in place.

The haulage service of any brewery is unusually severe on horses. In most road transportation work the load is hauled only one way, the return journey being usually made with empty wagons, thus giving the horses a chance to recuperate to a certain extent. But in brewery service the wagon has to pick up empty barrels and cases at nearly every place where full ones are delivered, and the total load that has to be hauled is thus not greatly reduced at any stage of the journey, certainly not more than 30 per cent at the outside, instead of 50 or 60 per cent, as when the wagons return entirely empty. This constant demand on the horses soon lessens their effectiveness, and reduces materially their useful life. A pair of fairly good brewery horses costs in Chicago about $650, this figure being the average price paid by eight representative concerns selected at random. Some of these concerns pay very much more, but none less than $550 a pair. The same companies say that the average life of their horses is about five or six years in brewery service. After that time they are practically useless for heavy work and are replaced by younger animals, provided that arduous work or sickness has not already killed them. As harness and wagons are also a constant source of expense, the brewer is in a fairly good position to motorize his entire transportation equipment in a very few years without much additional capital expenditure over the upkeep cost of his horse installation. The release of stable area for other purposes, once the horses are replaced, further minimizes the additional outlay, and as soon as the economy of operation of the motorized portion of a partially converted installation begins to tell, the complete change-over to motor service is a logical consequence.

Thus it is that a noticeable proportion of the largest fleets of motor wagons in this country are operated by

The outside of the Anheuser-Busch Company's garage showing a score of the 50 electric wagons used by this company in its haulage and delivery service.

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Make Date
Tire No. Invoice No.
Size New Rep. Type
Put on Auto No.
Odometer Reading
Charge to
Old Tire taken off was No.
Make
Size

Tire Invoice.

brewery companies. It is also noteworthy that brewers were among the earliest concerns to recognize the value of motor haulage and delivery. This may account for the fact that brewery companies use an exceptionally large proportion of electric motor wagons, for the electric machine was a proved success when the gasoline wagon was still largely an experiment. This, of course, was about ten years ago, and is no longer true today, nor has it been for five or six years back.

Having been converted from horse service by the splendid results of the electric motor wagon, it is not surprising that many of the brewers have stuck to their first love, so to speak, and still swear (the old ones, at any rate) by the electric wagon. And, as a result, one company alone (The General Vehicle Company of Long Island City and New York) has sold over $1,000,000 worth of electric motor wagons to brewery companies in this country—and the demand is still as brisk as ever.

Without attempting to discriminate between the two preponderating types of machines, it still will be admitted that while the electric is holding its own on short radius hauls, it is entirely out of its class on long distances. Thus it happens that many breweries which started to experiment with small fleets of electrics and afterwards increased these into big installations, have latterly begun to supplement their transportation equipment with gasoline wagons for outlying territories.

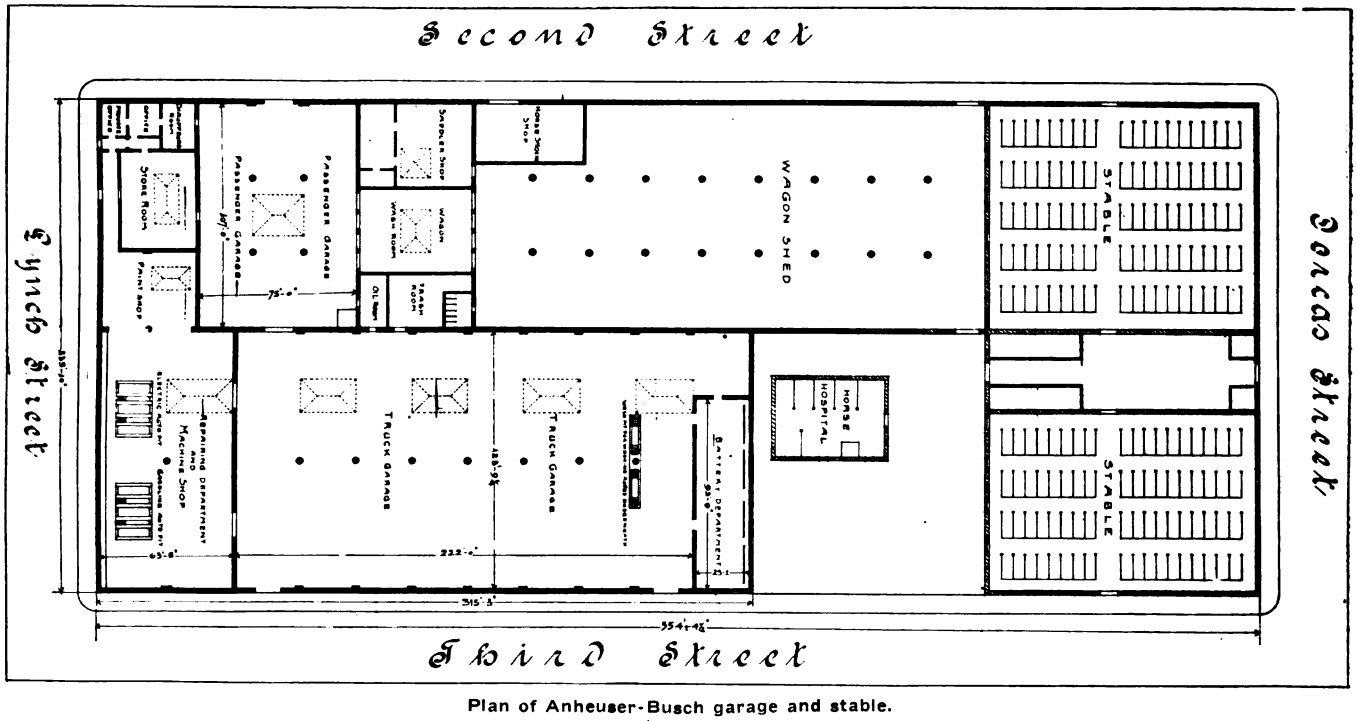
One of the best examples of mixed motor wagon fleets is found at the famous Anheuser-Busch brewery in St. Louis. Here there are 50 electric and 10 gasoline wagons, besides 24 passenger motor vehicles for the use of salesmen and the officials of the company. According to Charles A. Marien, who is in charge of this important motor fleet and who furnished the subjoined particulars and the pictures with which this article is illustrated, the company is well pleased with its present installation of motor wagons and will add more from time to time. Mr. Marien, as befitting his responsible position, is particularly well informed on all phases of motor wagon administration. He openly advocates the electric for brewery service, although admitting the special qualifications of gasoline machines for certain kinds of work. Perhaps Mr. Marien's very successful experience with electric machines has somewhat prejudiced him in favor of that type.

1116
No. Date
To
Please Furnish Estimate
The Following Tire
No. Size Type
Has Run
No. 1116 Date
To
Please Furnish Estimate
The Following Tire
No. Size Type
Has Run
Received by

Tire estimate card.

Speaking of the installation over which he exercises control, Mr. Marien said recently:

"The Anheuser-Busch Company has just signed a contract for an immense new garage which will cost complete, with all its equipment, about $130,000. The latest improved appliances for charging and maintaining 60 electric automobiles will be installed.



Plan of Anheuser-Busch garage and stable.

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"Out of 50 electric trucks at the Anheuser-Busch garage during the busy season, never more than one or two machines are laid up at any one time. There have been as many as ten consecutive days when every machine in the fleet was in condition to be put into service, and the records show that repairs on the street are very infrequent.

"These electric trucks are all operated by beer drivers, who are members of the Beer Drivers' Union. It takes only three days to break in one of these team drivers to operate an electric truck, when he is sufficiently competent to take out a machine for himself.

"It is needless to speak of the simplicity and durability of electric motors, for almost everyone is familiar with the stability of this article.

"Batteries have been improved in the past few years to the extent which enables us to get, at the present time, 10 to 25 per cent better efficiency. The Edison battery also promises to help strengthen the position of the electric in its field.

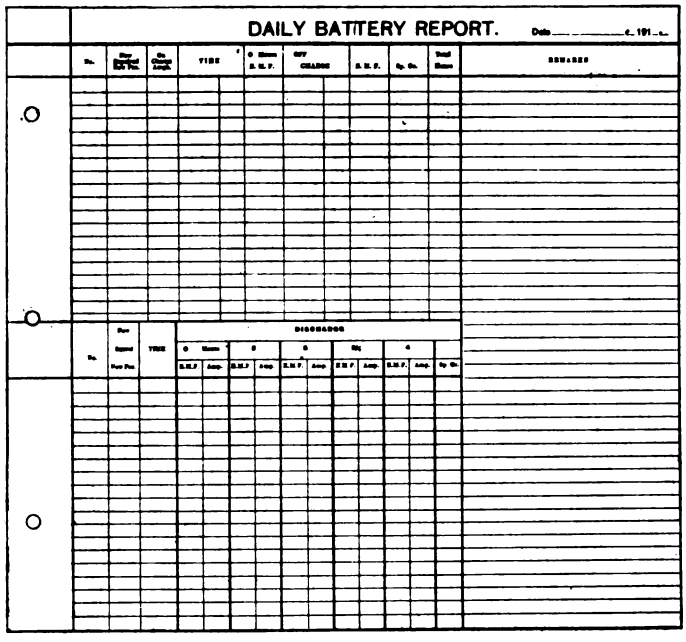
"The uniformity of the speed of the electric wagon, which is not too fast, makes it far more economical than any other type of machine. The tires do not heat. Springs, motors, batteries, body, etc., do not receive the severe jolting which would happen under faster speed. It is only natural for drivers to put on another notch if they have it, but the speed of electrics is regulated by the motor and number of cells in the batteries.

"Of course, after all, the electric will have to take its proper place, along with all other types of power-driven vehicles. There will always be a place for all types of power-driven vehicles as well as for the horse and the mule.

"We have at present 10 gasoline motor wagons."

Mr. Marien has worked out a scientific system of keeping a check on the performance of the machines under his supervision. The card system will be apparent from the reproductions given herewith. The accompanying illustrations, better than any amount of description, give one a graphic idea of the immensity of the motor wagon transportation facilities of the Anheuser-Busch concern.

The garage is a one-story building covering an area of over 1½ acres and measuring 315 feet 3 inches by 235 feet 10 inches. Extra large windows and numerous skylights afford splendid natural illumination to the interior. There are two large doors, one for entrance and the other for exit, so that incoming and outgoing machines will not interfere with one another.



Daily record card for batteries.

Automobile Repair Ticket

Date..... 191....

BATTERY

Burnt Strap
" Lug
" Jumper
Leaky Jar
Dead Cell
Burnt Jar
Batt. Needs Filling
No Power
Runs Slow
Clean Jumper Lugs

MOTORS

Armature Burnt Out
Field Coil " "
" " Grounded
Motor Hanger Broke
Clean Commutators
Turn "
New Brushes Needed
" Bearings "

CONTROLLER

Controller Needs Cleaning
Burnt Finger
Contact Burnt
Spring Broken

WIRING

Loose Wire on Batt.
" " " Motor
" " " Brushes

DRIVING GEAR

Needs Motor Pinion
" Drive "
" Pinion Gear
" Counter Shaft Gear
" Drive Gear
" Small Sprocket
" Large "

RUNNING GEAR

Front Axle Bent
Rear " "
Steering Head Bent
" Gear out of Order
Brake Binds
" Needs Tightening
Tire Worn Out
" Cut
" Loose

Remarks ..... No. TIME

No.... Driver..... Workman.....

Motor wagon repair blank.

Our No. Tire No. Invoice No. Shop No.
Make Type Date bought
Size New Reg. put on Auto No. Charge to
Date put into } Service Odometer reading
Date taken out of
Total months in Total miles
Condition of tire when taken off
Repaired by
Remarks:

Old Tire taken off was No. Size
Make Type

Tire record blank.

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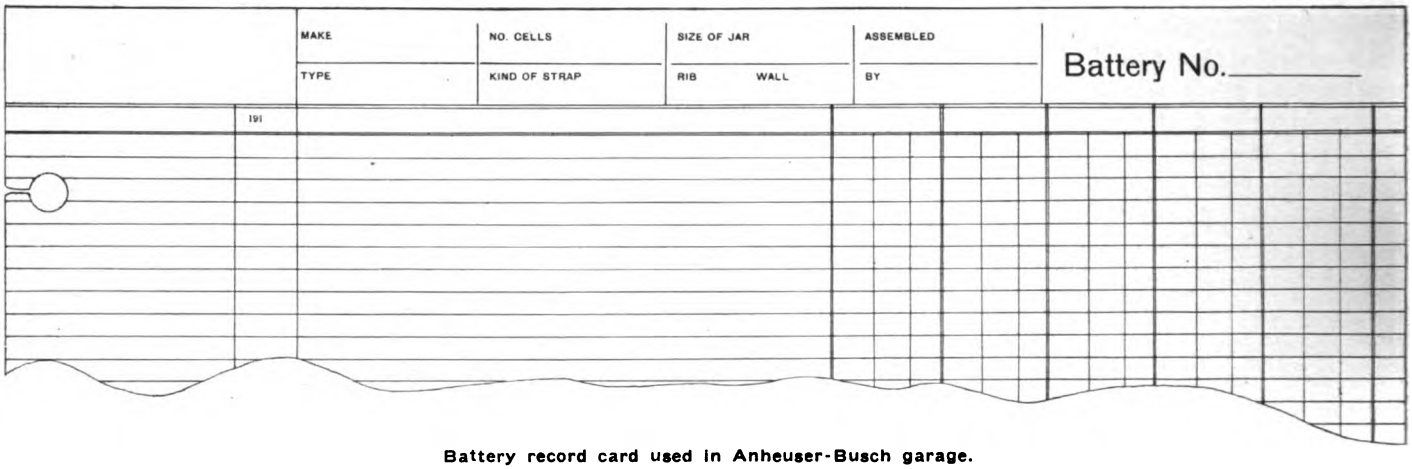

Battery record card used in Anheuser-Busch garage.

The main garage has many specialized departments. There are accommodations for stabling the motor wagons, a separate garage for the passenger machines, a machine shop, battery department, storeroom, private office for the garage manager, general office where records are kept (the private telephone exchange, which has extensions to all parts of the plant, is located here), a nicely furnished room for private chauffeurs, oil room (for oil and grease), trash room (for junk accumulations), etc.

At the south end of the building there is a wash rack which is large enough to allow of four machines being washed at one time. There is also a large underground gasoline tank with a capacity of 10,000 gallons. This large storage facility enables the company to buy gasoline in carload lots at a very reduced figure. Automatic fire doors are used throughout the building.

The machine shop contains a very fine equipment of machine tools, all of the latest pattern and driven individually by electric motors. The machine tools include a heavy pattern milling machine, a 24-inch lathe, a 16-inch lathe, a radial drill press, a small drill press, a shaper, a power-driven hacksaw, a press and a wet grinder. There is also an overhead 4-ton hoist which encircles the repair shop on a trolley and which is used especially for lifting engines out of the frames. One of the illustrations shows the west side of the machine shop, where the machine tools are located.

In another picture is a view showing the part of the machine shop where the repair pits, work benches and paint shops are located. The front pits are used for the gasoline machines, and those further back, which are somewhat shallower, for the electrics. At the far end of this room is the paint shop, where the motor wagons are redecorated during the winter months. In this department there is also a motor-driven dry grinder, used for general rough grinding, as well as a gas furnace which is employed for heating steel parts before hardening and tempering. These and the work benches also appear in this picture. In this shop, too, there is a large automatic air compressor. The compressed air is piped through the building, hose connections being provided at suitable places. The air is used for cleaning engines and passenger cars, inflating tires, etc.

View in the garage showing charging and lighting receptacles in the posts between two rows of machines.

In the picture of the battery department, shown herewith, may be noticed the switchboard, on the right, and a number of new groups of plates ready for assembling, on the left. In the rear there is a large table for battery washing. A lead burning outfit used for assembling batteries appears in front. Extra batteries to be used in case of emergency or to replace those which are being washed or undergoing repair are kept in another room just outside the fire doors.

In the construction of the gasoline car repair pits the use of heavy steel beams permits the handling of three machines at one time. The pits are equipped at each end with reflector lights which throw plenty of light underneath the machines. There are also hydraulic jacks and an extension light.

One of the 50 electric wagons used by the Anheuser-Busch Company.

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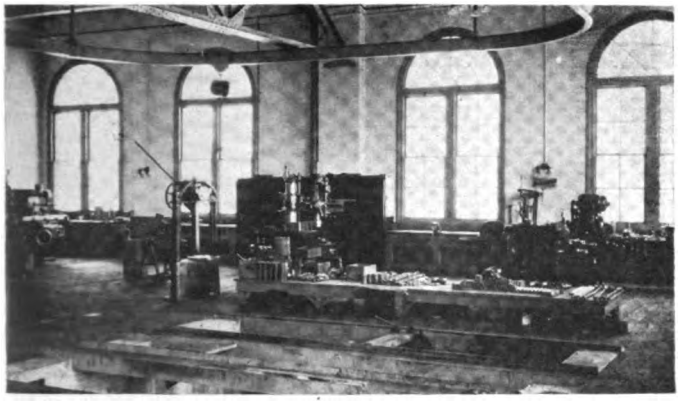
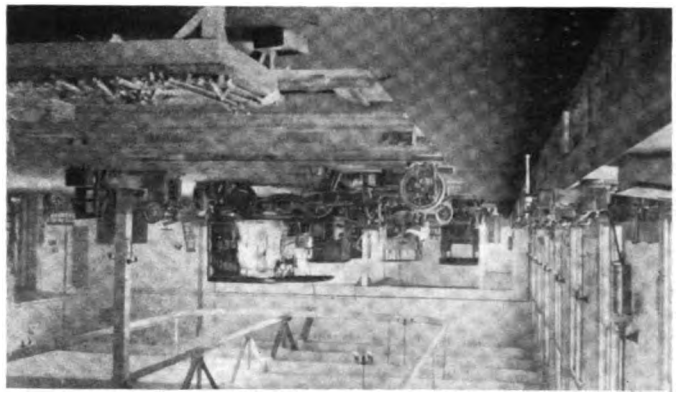


West side of Anheuser-Busch machine shop showing machine tools and 4-ton overhead hoist.



In the machine shop, showing the repair pits, work benches and paint shop.

The storeroom, illustrated herewith, contains steel racks and shelves on which are kept all different sizes of steel, iron pipe, repair parts and supplies used in the plant. There are also steel lockers provided for passenger car equipment.

In all cases where the company has a number of machines of the same make and capacity the policy has been to keep always on hand a certain number of duplicates of parts which are likely to need repair or replacement from time to time. This has worked out very well in practice and much time is saved in this way when any part breaks down and needs repairing or replacing. The company also makes a number of parts itself where experience has shown that it is economical to do so.

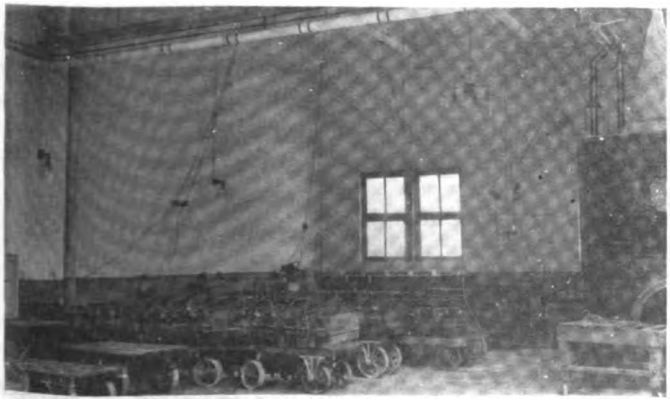
One of the most striking of the illustrations is that showing the center of the garage with two rows of machines, one on each side. It will be noticed that each post contains a number of extra heavy flush receptacles. The uppermost outlet is provided for the use of an extension light. The lower receptacles are for electric charging plugs. The line wires run underground in conduits and terminate in a long pit in the battery room.

There are many other interesting features in this splendid motor wagon installation, but enough has been adduced to give one a very good idea of the most important mechanical details necessary for the proper and economical administration of a large fleet of machines.

It goes without saying that the scientific handling of its transportation problem has had a great moral effect on the whole establishment of the Anheuser-Busch Company, with the result that the whole plant has been speeded up in sympathy with the machine-like methods employed in the hauling and delivery department. Waste of all kinds has been eliminated, and the whole business is a model of its kind. The operating figures of the plant are not just now available, but we are assured that the motors are very much more economical and give far better service than the horse, a point which is verified by the announced determination of the company to stick to motor transportation and to enlarge this department from time to time to keep up with business expansion.

The east aisle of the Anheuser-Busch garage. The machines on the right are 1½-ton electric wagons. Those on the left are gasoline trucks.

A motor police ambulance has been installed in Waco, Tex.



View in the Anheuser-Busch battery room.

Storeroom in Anheuser-Busch garage.

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The Specification Tables.

Every Manufacturer of Motor Wagons Is Invited to Read This.

BUYERS, manufacturers, dealers, and all others interested in motor wagons, will be attracted by the special feature which it is our custom to offer at this season of the year—the specification tables of gasoline and electric motor wagons, classified according to load rating.

Our tables of last year were keenly sought and highly prized. The present tables comprise seven or eight times as much information on each model, and are proportionately more valuable.

For those who are not represented in these tables, and for such makers whose models are incompletely described, we wish to announce that in our next issue we will again publish these invaluable tables, revised, corrected, amplified and as thoroughly comprehensive as possible. Material for this purpose should reach the "Power Wagon" office (332 Michigan Avenue, Chicago) not later than January 15 next, in order to be assured of inclusion in our February issue. Several lists which were received too late for the January issue will also be incorporated.

* * *

The tables, even as they are now, afford a pretty comparative study in motor wagon design, and should prove a great help toward ultimate standardization. When the final results are published we will give a critical study of the whole, massing the results in such a way that any designer may be able to compare his product with the average of accepted practice.

These tables are still another indication of the "Power Wagon's" educative and co-operative policy regarding its function as the foremost journalistic exponent of the motor wagon industry. The labor and expense of their compilation were greater than anyone would imagine who has not had a similar experience. In the forwarding of further material, therefore, we will appreciate any little care that will help to lighten the task of the office staff.

The Chicago Show.

THERE will be more exhibitors of motor wagons at the Chicago show, to be held in the Coliseum and First Regiment Armory from February 5 to 10, than at the two New York shows combined. The total number of concerns exhibiting business models at the two New York shows is 70. With the Chicago show almost six weeks away, the management has succeeded in selling every foot of available floor space to about 80 concerns, and if more room were available would undoubtedly receive the support of 25 or 30 more establishments. But it is not in mere magnitude of exhibitors that the Chicago show is going to excel. Its territorial location is so admirable that it will, as in the past, attract thousands of agents and merchants who cannot spare the time or money to visit the eastern exhibitions.

* * *

Of the 80 manufacturers who intend to display their 1912 models at this show, 20 are located in Michigan, 16 in Ohio, 12 in Illinois, 7 in New York state, 6 in Wisconsin and 5 in Indiana. Other states represented with from 1 to 3 makers each are Iowa, Missouri, Minnesota, West Virginia, Connecticut and Massachusetts.

The Chicago show will be especially notable for the large number of manufacturers who will exhibit models for the first time. There are more than twenty of these.

DEALERS ORGANIZE IN PHILADELPHIA.

A motor truck division of the Philadelphia Automobile Trade Association was recently organized. It comprises the local representatives of 23 motor wagon makers. H. M. Cole, sales manager of the Autocar Company, is the chairman.

MOTOR OIL TANKS FOR WATER SUPPLY.

A difficult situation at Kansas City, Mo., was recently saved by the use of motor trucks. It appears that the ponds and wells which were constructed a year or so ago to supply the county hospital with water have proved wholly inadequate, and a water famine was imminent until some genius suggested the use of motor-driven oil tanks. Two of these machines had been in use for oiling the roads. They were turned over to the hospital authorities and are now making five trips a day between Little Blue Creek and the hospital, a distance of over a mile, carrying 1,000 gallons of water on each haul per machine. This water is used for sanitary purposes. Wells on the country farm meet the demand for cooking and drinking water.

The motor police patrol at Wilmington, Del., costs the city $40 a month for upkeep, including tires, etc., as against $125 each for the horse-drawn vehicles.

Fort Wayne, Ind., will shortly install a motor truck for hauling water main pipes and for general transfer work.

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HYATT ROLLER BEARINGS.

A prominent English editor recently commenting on some problems now confronting the automobile engineer included the points of silence and flexibility. It is of course patent that the attainment of these features must come through their being contained in the component parts of which the completed car is made up. Of anti-friction bearings the one which claims as an exclusive feature the flexibility mentioned above is that manufactured by the Hyatt Roller Bearing Company, of Detroit, Mich., with works at Harrison, N. J.

Silence is not so much to be thought of in connection with the bearings themselves but in the operation of shafts and gears mounted on them. Hyatt bearings, as a result of flexibility combined with stability, insure this quiet operation.

A prominent type of the above bearing has for years been the long spiral or "flexible" roll (Fig. 1) used in axle construction. This long bearing operates in a rolled up or "planished" outer race or lining and runs directly on the shaft. Many prominent 1912 machines are equipped with this bearing, it being the practice now to heat-treat the shafts where the cars involved are large or heavy. A new feature

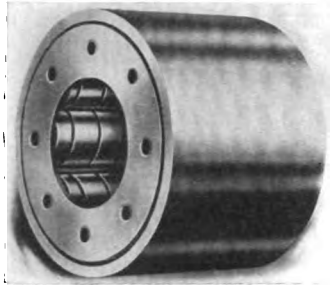

Fig. 2. High duty bearing.

of the rolls in this bearing is that while formerly a high-carbon steel was used they are at present made of a chrome nickel steel properly heat-treated and ground. A test piece of this steel taken at random showed a tensile strength of 216,000 pounds per square inch and an elastic limit of 196,000 pounds per square inch.

The outer lining, always satisfactory as a race for the long rolls, has had a slight improvement added in the form of a welded button for holding it in position in the housing. The button takes the place of the punched projections formerly used and has on one end a reduced section which is set into a recess in the lining. The two are then spot-welded, and the combined holding effect is sufficient to make it impossible to remove the buttons in assembly or use.

Fig. 2 shows a type of bearing which is new rather in application than in design. Having been tested for several years in a large number of transmissions of one or two types, the 1911 and 1912 cars show an increasing adoption by progressive engineers. The rolls are made of 3.5 per cent nickel steel and possess, after treatment, just the flexibility required to assist toward the "noiseles transmission" and at the same time hold the gears in absolute alinement.

Fig. 3 illustrates the cage for this type of bearing. It has a round bar extending from one end ring to the other between every pair of rolls, thus differing from the

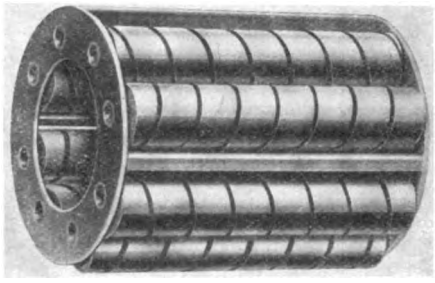

Fig. 1. Standard bushing.

standard type on account of its shorter length and the greater speed for which it is designed.

The rolls are "close wound," acting as oil reservoirs and carriers, and thus assisting lubrication. The inner and outer races are formed from the solid, case-hardened and ground. The new feature of these parts is the use of an alloy similar in content to that used for rolls of the standard type.

Fig. 4 shows the application of Hyatt bearings to the transmission of an engine. In this service, where shafts are made of alloy steel and sufficiently treated or hardened, it is possible to omit the inner race of the high duty type.

The output for 1912 of Hyatt bearings of both types for automobile service exclusively is estimated at between one and one-half and two millions.

LAUTH-JUERGENS PROGRESS.

Prominent among the many concerns which have found it necessary to increase their motor wagon manufacturing facilities

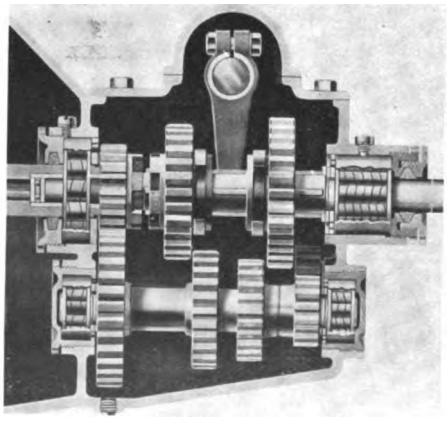

Fig. 4. Transmission.

in order to keep up with a rapidly increasing business, is the Lauth-Juergens Motor Car Company, of Fremont, Ohio. This company has just completed plans for a new building, 250 by 60 feet, which is to be used for assembling and body building. The demand for Lauth-Juergens motor wagons made it necessary for the company to triple its capacity within the last six months. Another large building will be erected in the spring and it is hoped with this addition of two new large buildings, together with the three present buildings, will be sufficient to take care of the next year's business, a large part of which is already on order.

Among the latest additions to the agency connections for Lauth-Juergens machines are the Mutual Auto Co., of Duluth, covering northern Minnesota; P. A. Brink, of Los Angeles, covering the lower part of California, and A. S. Lascelles & Co., of New York, covering Australia.

Recent orders for Lauth-Juergens motor wagons include four 1 ton and one 2 ton machines for Brink's Motor Express, Los Angeles, Cal., and two 2 ton motor wagons for the Katz Mattress Company of Chicago. This is the third order received by Lauth-Juergens from the Katz company.

PARKER HAS NEW JOB.

Announcement is made by the Packard Motor Car Company that it has secured Frank E. Parker to manage the motor

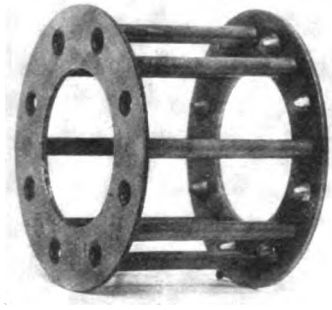

Fig. 3. High duty yoke.

truck sales department of its Chicago branch. Mr. Parker says:

"The present brisk demand for motor trucks in this city points to the probability that at this time next year the number of Packard motor trucks in Chicago will be at least double the total sales to date.

"Packard service has been one of the most potent factors in the rapid increase of our motor wagon business. Every Packard truck is inspected twice a month regularly by an expert, without expense to its owner, and kept constantly up to a standard of efficiency.

"This makes every Packard owner a 'booster,' and with the well-known strength and policy of the Packard company behind it, our motor truck cannot do otherwise than give every owner entire satisfaction."

Mr. Parker plans an active campaign among Chicago merchants. He is an expert motor truck salesman, and formerly exploited the products of the American Locomotive Company.

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SPEEDWELL CONFERENCE.

Indicative of the thorough going business policy of the Speedwell Motor Car Company was its recent action in bringing all its motor wagon dealers from all parts of the country to the home office at Dayton in order to give them an intelligent understanding of power wagon conditions, and to discuss salesmanship methods. Naturally the company paid all expenses.

The Speedwell company is one of those far-seeing concerns which believes in selling its motor wagons only to those who unquestionably will profit by their use. and in refusing to sell to those who may not. In conformance with this policy the company insists in acquainting intending purchasers with every possible item of expense connected with the installation, operation and maintenance of his motor wagons. This is sound business and, although it may militate against a sale in a few isolated cases, will more than pay in the long run, and both the company and the power wagon industry will be the ultimate gainers.

The conference was scheduled for December 11 and 12, last, but there was so much to discuss and enthusiasm ran so high that an extra day was added.

The agents received much valuable information from R. Harry Croninger, who is now in charge of the truck end of the Speedwell business. Mr. Croninger is a man of wide experience in truck work, so that he approaches the motor wagon problem in a most intelligent way. He believes in first showing the prospect how he may readjust his methods of handling goods to fit the demands of the machine; then in demonstrating its economy; then in giving the prospect a most conservative and liberal estimate of probable operating costs; and then, if installation is made, in co-operating with him to educate his drivers and mechanics so that they will give the sort of attention and consideration which will produce greatest efficiency.

The agents brought from the field many ideas that were of great value to the factory and furnished each other with ideas and helps that will prove of inestimable value in their work.

All the officers of the Speedwell company addressed the agents on matters of interest, while in the open meeting every agent was afforded the opportunity of presenting his own pet ideas.

On the evening of December 11 entertainment was furnished in the way of a vaudeville theater party, while on the following evening a dinner was served at the Dayton Automobile Country Club, where Mayor Burkhardt, of Dayton, addressed the guests and Chief Allabach spoke on the remarkable saving to the city, accomplished by the Speedwell patrols and ambulance cars, placed in service several months ago and which have run about 10,000 miles each.

Speedwell agents present at the conference included: B. A. Jackson, New Orleans; Frank A. Groves, Chicago; H. D. Karshner, Kansas City, Mo.; L. V. Lynch, San Francisco; Paul C. Curtis, Boston; G. B. Garrison, Chicago; George L. Baker, Dayton; A. J. Sanderson, Buffalo; C. A. Nation, Portland, Oregon; John Cunningham, Rochester; W. L. Hicks, Nashville; E. A. Kimmell, Columbus; H. H. Hawkins, Los Angeles; M. J. Adams, Troy; Eugene Hankins, Jacksonville; E. S. Shanks, Louisville; George Turner, Pensacola; J. B. Hastings, Montgomery, Ala.; J. A. Kays, Meridian, Miss.; Mitchell Nash, Waco, Tex.; Will Spring, Houston; E. B. Jenkins, Pittsburgh; Art Fischer, Cincinnati; Lloyd Richards, Mobile, Ala.

A paste of graphite and turpentine makes a tighter joint for narrow bearing surfaces than oil and graphite.

J. Schaffner, of Butler, Pa., has a Packard for hauling bricks. It has replaced 12 horse teams.

SPLITDORF AT N. Y. SHOWS.

Educational indeed is the exhibit of C. F. Splitdorf of coil and magneto renown. A sectional view of the Model F low tension magneto at once discloses and clears up many of the so-called "mysteries" of magneto construction. The armature, distributor and circuit breaker are in full view and the owner can see for himself exactly what duties a magneto performs.

A working model of the largest magneto in the world, weighing 800 pounds and standing nearly 4 feet high, is another Splitdorf educational feature for laymen and wiseacre alike.

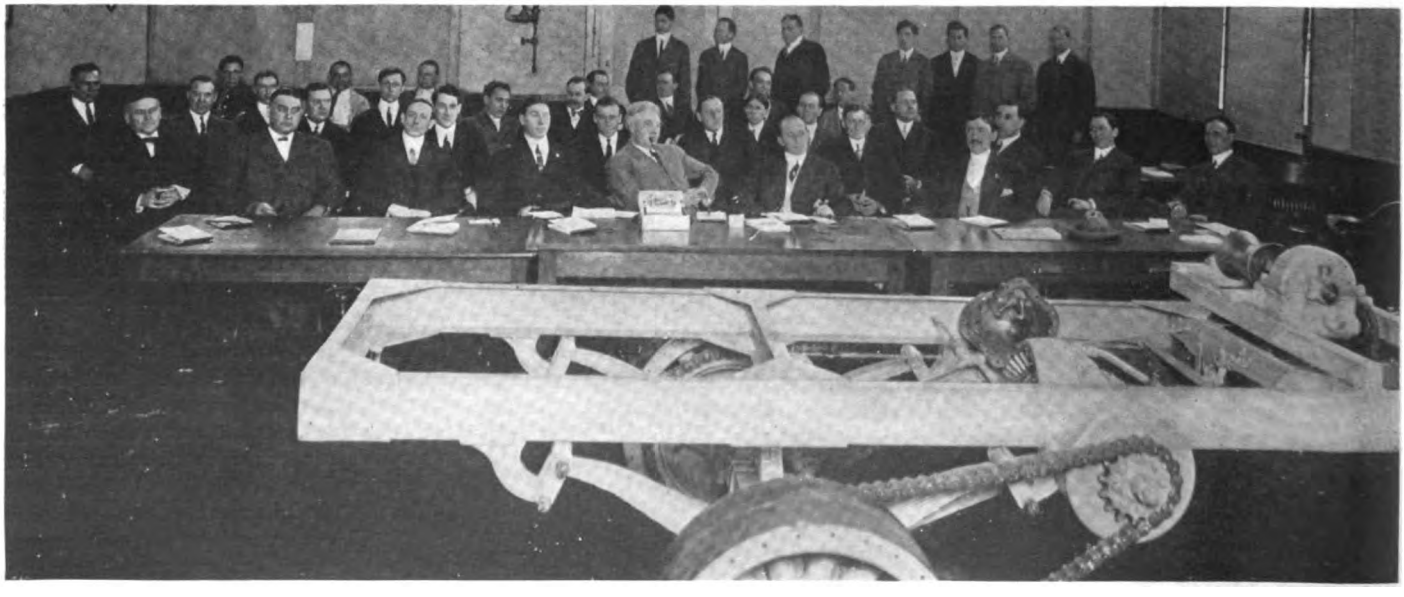
All the low tension Splitdorf models are exhibited, but there are new features on exhibition of great interest to the trade in general. The new high tension magneto which is being supplied to the foreign trade, and the new booster type of high tension magneto soon to be placed on the market here, are on exhibition in addition to the new "Splitdorflite," the Splitdorf device for lighting by generator.

Splitdorf innovations on low tension models are chiefly in interior design more particularly incorporating, as they do, the latest insulation improvements.

PEERLESS APPOINTMENT.

R. S. de Mitkiewicz has resigned his position as sales engineer with the Motor Engineering & Sales Company, of New York, to accept an appointment in the motor wagon department of the Peerless Motor Car Company, of New York. Mr. de Mitkiewicz will be located at the New York office, placing Peerless motor trucks in the East.

Jersey City's Board of Trade has unequivocally indorsed the use of motor wagons to relieve the present freight congestion in the city and at the railroad termini and steamship piers.



Group of Speedwell agents who attended a 3-day educational conference at Dayton, Ohio, on December 11, 12 and 13.

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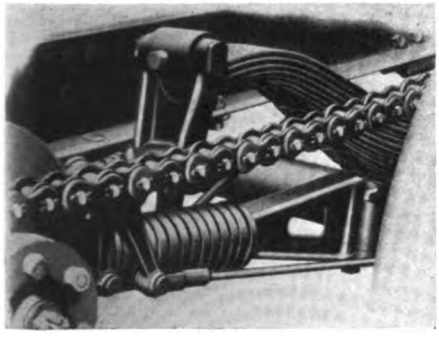
VELIE MOTOR WAGONS.

Although the Velie Motor Vehicle Company was one of the most recent automobile makers to come into the motor wagon field, this company is now producing a line of machines which are first class in every particular, as befitting the reputation of the manufacturer.

Certain features of the Velie power wagons are worthy of special mention. The rear axle, for instance, is unusually strong, being made of 4-inch, round, solid steel. Dual tires, 40 by 5 inches, fitted to wheels having 3-inch square spokes, gives the Velie an exceptionally strong rear wheel and tire assembly. Large tires mean long life and heavy wheels a capacity of withstanding overloading without depreciation. Two sets of brakes, 14 by 2½ inch, and 18 by 3½ inch, insure a perfect control at all times.

The rear springs are hung outside of the frame instead of underneath, as is usual. The Velie method of spring suspension immediately lowers the center of gravity of the truck 6 inches and at the same time throws the springs nearer the wheels and consequently removes the load



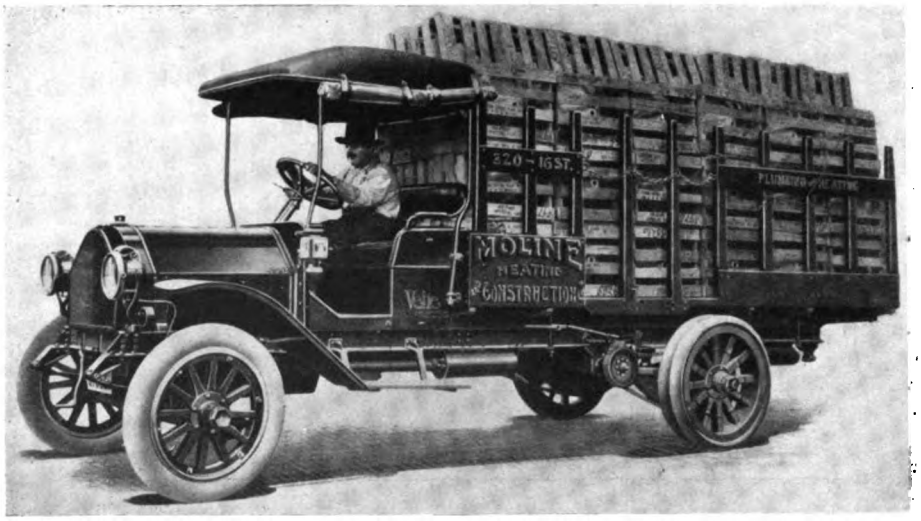
Spring strut rod and outside spring suspension of Velie motor truck.

from the center of the axle and places it near the wheels where it is properly carried. The frame of the 3-ton machine is equipped with a 6-inch I beam section, practically 4½ pounds heavier per foot than a channel section and 67 per cent stronger. It is also heavily braced.

The power plant is carried on a 4-inch subframe, which insures the transmission system being in perfect alignment at all times and not subject to the strains and twists resulting from heavy service. This subframe is arranged in such a way that the motor may be pulled out of the truck bed to the front by merely removing the radiator and unbolting the front cross member. This is a remarkable example of accessibility.

The Velie radiator is hung in a cradle extending clear around the radiator base, which in turn is supported by coil springs and no movement of the frame, however severe, can be transmitted to the radiator. Unusual radiator size prevents overheating.

The strut rods are built in two telescoping sections and provided with heavy coil springs. By this method all the unusual



Velie 1½ motor truck with stake body.

shocks coming from sudden starting or stopping, or unequal strains encountered in heavy road service, are absorbed by the springs and not transmitted to the chains, gears or differential. This feature must be watched in actual service to be appreciated, but its value is noticed in the absence of repairs.

The differential is provided with a lock which is operated by a foot pedal controlled from the driver's seat. In slippery places or when one wheel has traction and the other has none, or in case of a broken chain, the differential lock may be applied and will be effective in overcoming any of the obstacles mentioned. It reduces the liability of skidding which might result disastrously. The differential gear is 15 inches in diameter and of unusual strength.

The body is so balanced that when the motor wagon is loaded to its maximum capacity but little more weight is thrown on the front axle and consequently the truck is always easily controlled and the driver is not fatigued by steering. Lighter front springs protect the motor and delicate parts.

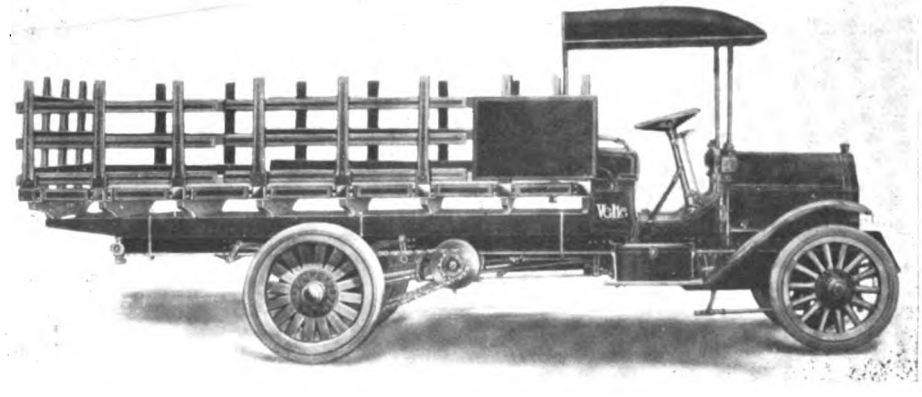
The motor is especially designed for the truck. Long stroke and smaller bore give it a maximum pulling effort at slow speed and maximum power on hills, etc. The motor governor prevents a greater speed than 12 miles an hour and is securely sealed in a case, making it impossible for the driver or others to tamper with its adjustment.

The fact that the motor and all component parts of the Velie truck assembly are in accessible positions assure the owner that his driver will give more care to oiling and adjustment than would be the case were the parts not so accessible. All of which tends to lower the cost of service, upkeep and depreciation.

DINNER TO SPICER HEADS.

Fit for any Christmas table was the dinner given to its foremen and department heads by the Spicer Mfg. Co., of Plainfield, N. J., on December 16 last. The object of the gathering was to bring the men together socially as well as on the business basis, and the evening was open to suggestions from all on the improvement of conditions that would prove of mutual benefit to the company and to the employes.

It is the company's intention to give a series of these dinners. J. C. Whiteside was the guest of this, the first. He is engineer of the New York Leather Belting Co., of 51 Beekman street, New York City, and gave a most interesting and instructive talk on the manufacturing and usages of belting. At each of the late dinners it is proposed to have as guest a man who is a recognized authority in some particular manufacture, to lecture on the same.



Velie 3-ton motor truck with standard stake body.

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The first Clark sold to a customer—shown pulling a trailer wagon in Oakwoods Cemetery.

CLARK DELIVERY CAR CO.

The history of the evolution of the successful motor wagon contains no chapter more fascinating than the story of the Clark Delivery Car Company, of Grand Crossing, Chicago.

For sheer grit and the determination to produce the best possible 1-ton motor wagon, regardless of expense and in spite of many besetting difficulties, the Clark people cannot be commended too highly. And no one can begrudge them the success which was finally their portion when the Chicago Motor Club's three-day demonstration on September 18, 19 and 20, 1911, resulted in the award of the cup in the 1-ton class to the Clark Delivery Car.

The entry of the Clark company into the motor wagon field was made five years ago, when A. C. Clark, who guides the destinies of the concern, commenced with the manufacture of a 1,000-pound model. Five experimental machines were made, each one better than its predecessor, and in this first attempt the sum of $25,000 was cheerfully spent.

Somehow or other this model did not satisfy the Clark company, and it was decided to wipe the slate and start all over again—with the $25,000 worth of experience, unlimited faith and pluck, and considerable capital to back up these men who were out to make a success or nothing.

The company, acting on the advice of specialists, finally decided to abandon the 1,000-pound model and concentrate on a 1-ton machine, which was conceded to have a better field than the other. Money was spent unstintingly to collect all the available information on the design of a 1-ton model, and this material was turned over to a motor wagon designer who is considered to be as well informed on the subject of power wagons as any man living.

The designer then called into consultation another expert who has had an unrivaled experience in the construction of automobile parts. After months of hard work, the first Clark 1-ton machine was turned out of the shops. This was two and a half years ago.

This model was built for trial, and well tried it was. Nobody was asked to purchase. The time was not yet ripe. The little Clark was loaded with 1-ton of sand and sent out on the road for hundreds of miles, under all kinds of conditions. Whenever a weak spot developed it was remedied. For the main thing to be accomplished at this time was not to build a machine to sell at a given price, but to make the best possible 1-ton motor wagon.

All of this initial work was along the lines of manufacturing a machine that could be used successfully and economically with hard tires. In the last two and a half years ten models have been made, each one an improvement in some way on the others from which it had been evolved. Eight months ago the first order was filled—not because the early machines could not have been sold, but because the Clark company wanted to make from the very beginning the reputation of having the best 1-ton motor wagon on the market.

The first machine sold was to the Oakwoods Cemetery. The roads on which this motor wagon is used are very good, which may account for the fact that the machine has displaced six teams of horses and is keeping the men busier than ever. It is used for hauling sand, cement, leaves, grass wagons, etc.

Soon after this first order was placed another motor wagon was sold, this time to the Pullman Company, to do general hauling around the factory at Pullman, Ill. The fine performance of this machine led to a repeat order for two more, one for immediate delivery and the other to be delivered in sixty days. From this time on orders have become more frequent. The company is now building motor wagons in lots of 25 and expects to make and sell 300 in 1912.

The personal history of A. C. Clark, president of the Clark Delivery Car Company, is in itself a story of dogged pluck and perseverance, and prepares one for the success of the concern in surmounting its early difficulties in the production of a successful motor wagon. Mr. Clark started in business eighteen years ago with practically nothing and has built up, in that time, one of the largest factories in the dental supply business in this country. His idea, when he started, was to manufacture a fountain cuspidor that was better than the rest. That idea has been carried into the factory and office of the Clark Delivery Car Company, which has always endeavored to keep in advance of the procession. The company has always charged more money for its goods than most of the others, and there has never been a time, during the past fifteen years, that the dental concern has been able to catch up with its orders. The same kind of interest and desire has been thrown into the motor wagon business, and the company believes, that when it is ready to turn out cars in large numbers, there will be plenty of business for the Clark Delivery Car Company.

In a future issue we will give a detailed description of the Clark motor wagon on which, as the company proudly testifies, the last thing done was to set the price.

GOODYEAR IN GLIDDEN.

The Federal motor wagon, which won a cup in the recent Chicago-Detroit reliability contest, and which, after demonstrating in Chicago for a couple of months, was a participant in the Glidden tour and went through the entire tour carrying considerably more than a ton of baggage, is still running on the same Goodyear tires on which it was tested before it left the Detroit factory.

The service this machine has been put to has been as uniformly hard as possible—practically all country roads—and the motor wagon has in both reliability contest and Glidden tour, carried an overload of about 30 per cent more than its rated capacity.

The road conditions on the Glidden tour were exceptionally hard on tires owing to the large amount of new macadam road and the numerous fords through which the car was forced to pass. Nearly all of these fords were of the rock bottom variety. In spite of all difficulties not a moment's trouble was experienced with the Goodyear tires and they are still capable of much additional service.

A 3000-pound Federal motor wagon is being used in a motor freight service recently installed by "Bud" Norton between Mesa and Roosevelt, Ariz.

The cost of horse shoeing per team for general cartage in Detroit varies from $54 to $77.50 a year; veterinary fees from $12 to $20; wagon and harness repair from $24 to $100.

The Toledo Auto Delivery Service Company has been incorporated in Toledo, Ohio, with a capital of $10,000.

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KISSEL PULLS BIG LOAD.

Look at the picture, and imagine, if you can, how many horses it would require to run away with this load!

The boiler weighed 37,000 pounds and rested on an iron-wheeled truck weighing 6,500 pounds. The combined weight of load and trailer was thus 43,500 pounds—21¾ tons.

The Kissel 3-ton motor wagon handled the load without using any ballast on the machine to secure traction. Any extra traction that was needed was afforded by the use of the differential lock, a device operated from the driver's seat with a foot lever which locks the two rear wheels solidly together and prevents either from spinning.

The story of the feat is well told by S. K. Johnson, manager of the truck department of the South West Kissel Kar Branch, Kansas City, Mo. Said Mr. Johnson:

"The load was carried from the Milwaukee station along level ground for a quarter of a mile to the foot of Main street. Turning into Main street we pulled it three-quarters of a mile up a three per cent grade all the way. About a third of this distance was over brick pavement. The rest of the journey was over an asphalt pavement into which the wheels of the trailer cut from one to two inches as we moved along, and on the stop we made to allow a street car to pass, the wheels settled three inches before we could proceed.

"Arriving at the top of the hill we swung around the corner of Twelfth street and dropped down half a block with this immense load pushing against our truck brakes. We successfully swung it into an alley and placed it into position without help of any kind.

"A significant feature of this demonstration was the fact that the transfer company for whom we handled it doubted our ability to turn the trick and had six teams of the largest horses in their possession on hand to take over the work should we fail to get away with it. These twelve horses trailed along behind us all the way, but not once did they touch the load and were finally sent back to the barn without having been used."

CORROBORATION.

Independent testimony by unbiased strangers generally constitutes the strongest kind of evidence concerning a business. Elmer E. Bray, a roving correspondent of the Lynn (Mass.) "Item," has been visiting various automobile establishments throughout the country, and contributes the following concerning motor wagons in general and the Chase machines in particular—we cull from the Lynn "Item" of recent date.

"Three years ago the Chase company put its first motor wagon on the market. It was the result of many years of experiment and, although business men were extremely skeptical as to its ability to supplant the horse, a few were sold, and preparations were made to manufacture about 100 the succeeding year. The first factory was two rooms and an office. It seems almost beyond belief that the splendid factory now occupied by this company should have been built up a little at a time in the short time the company has been in business. Yet it is true, and additions are now under way which will double the present capacity.

"Mr. Chase, the designer of the Chase wagon and Chase motor, is a young man. He combines the artistic, the inventive and the business mind to an unusual degree. He is a violinist of much more than local fame, the inventor of the simple, economical and efficient motor which is used in his wagons and the head of the Chase company, which has made such wonderful strides under his management.

"Since the first wagons were sold careful records of their upkeep and repair costs have been kept.

"Reports from New York, Chicago and Philadelphia, as well as records of the Chase company in Syracuse, show the average cost to be between 6.5 and 6.8 cents per mile. These figures are average, and extend over a year's use. They include gasoline and oil, repairs, driver's wages, interest, depreciation and tires.

"When we consider that the average horse will not make more than 20 miles a day and his driver must be paid at least $1.50, we can readily see that it costs over seven cents a mile for driver's wages alone. Add to this the cost of feeding and shoeing the horse and you can readily see why I am firm in my belief that the motor wagon must eventually supplant the horse drawn vehicle for commercial purposes."

MOTZ HAS N. Y. BRANCH.

The Motz Tire & Rubber Company of Akron, Ohio, has opened a New York salesroom at 55th and Broadway. E. P. White, who was formerly with the Goodyear Tire & Rubber Company, is in charge of the new branch.

The Auto Truck & Contracting Company has been incorporated in Oregon with a capital of $10,000.

The Premier Motor Mfg. Co., of Indianapolis, Ind., is yet another pleasure car concern that has broken into the motor wagon field.

Kissel motor wagon pulling a big load on trailer—unloaded itself.

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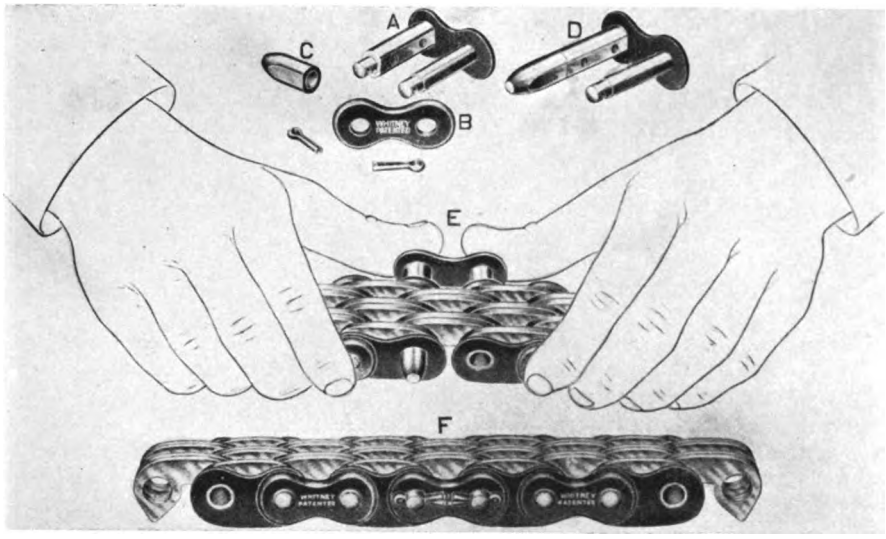

Whitney "silent" chain. A, B, connecting link; C, pilot pin; D, connecting link with pilot pin in place; E, connecting link being inserted into place; F, chain with connecting link inserted.

WHITNEY SILENT CHAINS.

The Whitney Manufacturing Company, of Hartford, Conn., has added to its list of specialties a unique design of chain of the silent type. After a number of years of experimental work with chains of this character the company is now prepared to place its silent type chain on the market. In fact, it has already furnished many drives of this type and they have made good.

The construction of this silent type of chain is such that the sprocket wheels used in connection with it need not be flanged or grooved, thus gaining the entire width for wear. This is accomplished by means of guide plates which are a part of the chain. The guide plates are connected by outside plates which give added tensile strength. The links are so assembled that each joint has four wearing surfaces, making a very long-lived chain. Hardened steel bushings are forced into the guide plates by machinery so that they are held fast and cannot turn.

The steel links turn about the outside of the hardened steel bushings, and the hardened steel rivets, which are also forced into the outside plates, turn within the hardened steel bushings.

These chains are made in various sizes—⅜, ½, ⅝, ¾ and 1-inch pitch—and also in various widths to suit requirements. They are used for driving magnetos and camshafts on gasoline engines, machine tools, line shafting, motors, generators, pumps, and also in transmission for speed changes on automobiles.

FINE FEAT BY ALCO.

A 3½-ton Alco motor wagon, equipped with Hartford solid tires, completed successfully during the week preceding Christmas, one of the most unique endurance tests that ever has been attempted in demonstrating the enormous capacity for work of a self-propelled delivery wagon.

The machine was placed in service on Monday, December 18 last, to aid the Philadelphia branch of the Adams Express Company in handling its tremendous volume of Christmas business. Since that time it ran continuously night and day until Saturday night, December 23, without once stopping the motor. The crew of driver and helpers was changed every few hours.

Commenting upon the results of the experiment, an official of the express company said: "The truck running day and night is more valuable than any six teams of horses we have. While on duty the machine hauls three times as much goods in a day as a team of horses and the hours that horses can work are limited."

In one stretch of 24 hours the motor wagon carried 120,000 pounds of goods, making 20 trips. The tires with which it is equipped rendered perfect service.

The machine displayed a large banner telling the story of the run in these words: "3½-ton Alco in nonstop service." At intervals during the day the number of hours of service was designated.

The start was made at 7 a. m. from the garage of the Adams Express Company, the Alco being loaded with parcels for both city and suburban delivery.

A record was kept of such items as the number of miles covered, parcels delivered, stops made, and the amount of gasoline and oil consumed.

Economy in the consumption of gasoline and oil was reported. The average was one gallon of gasoline an hour. Theater crowds were attracted by the motor wagon because of the large gas searchlights that replaced the oil lamps for night duty. The appearance of the machine in the most exclusive residential sections of the city also created much comment.

In its first day of nonstop service, the Alco delivered: A big Texas steer, four tons of turkeys, a load of Christmas toys, a load of oil paintings for the Bellevue-Stratford, and many loads of miscellaneous articles, one load of which contained 300 parcels. Long-haul service was also included in the itinerary. At the completion of the wonderful performance, the motor wagon had hauled during its week of continuous service approximately $300,000 worth of merchandise; 1,200 parcels, boxes, etc., weighing 450,000 pounds; and it had made 800 collections and deliveries.

Lyon & Healy, Chicago's piano merchants, do as much work with each of their motor wagons as was formerly done by three teams of horses.

A motor-operated device which plows, plants potatoes, digs up the tubers and afterwards carries them to the barn has been built in Cleveland for use on a 26,000-acre farm in California. The seat is four inches lower than usual to accommodate the diminutive Japanese laborers who are employed on the farm.

The 3½-ton Alco which made motor wagon history on its recent 168-hour nonstop run in heavy express service and delivery. It is shown leaving the garage of the Adams Express Company in Philadelphia on its first trip.

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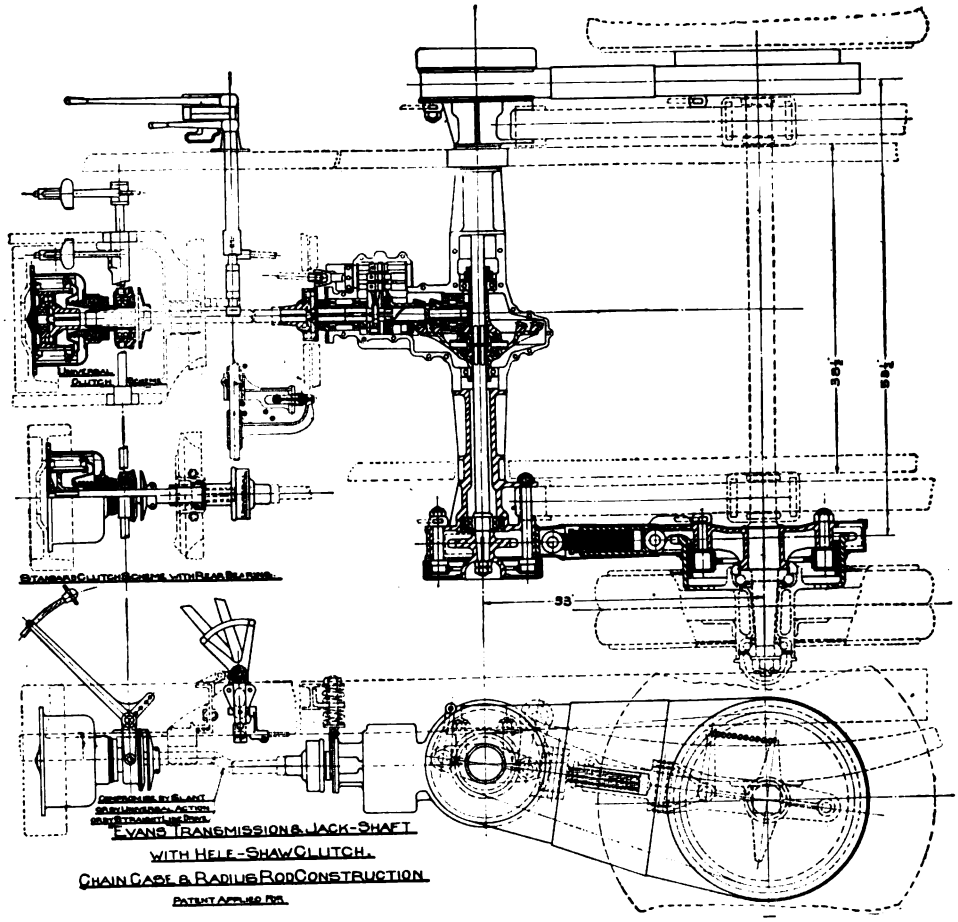
This House was Delivered 130 Miles
On Our Big Packard Motor Truck
It left the Irvington Factory two o'clock in the morning and arrived at the Pennsylvania Horticultural Show that afternoon at three
Lord & Burnham Company
Factories: Irvington, N. Y. Des Plaines, Ill.
NEW YORK BOSTON PHILADELPHIA CHICAGO

GOOD FEAT BY PACKARD.

How a curved eave horticultural house, 16 feet long and 11 feet wide, was delivered 130 miles in 13 hours on a big Packard power wagon is told in an advertisement recently published by the Lord & Burnham Company, which has its factories at Irvington, N. Y., and Des Plaines, Ill., and offices in New York, Boston, Philadelphia and Chicago. The advertisement tells its own story. Look it over. It is worth while.

EVANS CLUTCH AND CHAIN CASE.

An improved design made for years by the Merchant & Evans Company, of Philadelphia, combines a light, strong, simple, durable and accessible chain case with the jackshaft transmission. It is shown on this page. The Evans universal clutch, of Hele-Shaw pattern with grooved disks, is also shown. The wedge action of the V grooves gives great power in driving with light pedal pressure; while for slipping, the great number of surfaces and their area makes the clutch flexible and easily manipulated. The pack of wedge grooved disks running in a lubricant adapts the car for hard and trying service. The clutch is made to do this work as its ordinary duty; not as a special function only possible to a skilled driver. The load is distributed over all the surfaces in contact, and the great number of plates with their large thoroughly lubricated wedge area places but a fraction of the load on each part, thereby preventing undue wear.



When the clutch is let in, the pack of plates is compressed by springs and the V grooves intermesh, gradually bringing the driven series to the speed of those driving, but before the surfaces actually touch the oil is forced out from between them. It is this cushion of oil in the peculiar form of these plates that makes "fierce" engagement impossible, a factor of the greatest importance.

ANOTHER REORDER.

The well known coal firm of H. L. Herbert & Company, of New York, recently added five more Commer motor wagons to its present equipment of three, making altogether a fleet of eight.

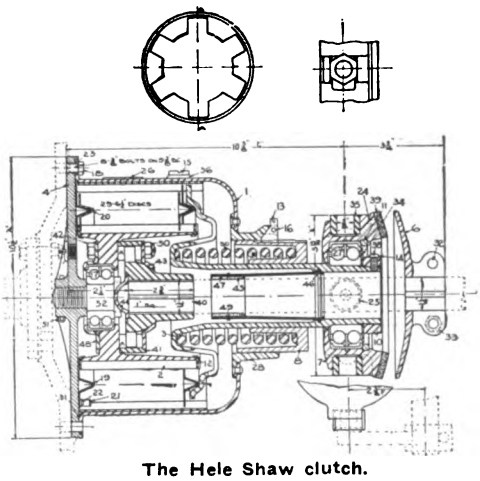
The early experiments of this firm with motor driven trucks had not proved satisfactory and the company had practically decided to stick to the old method of delivery with horses. A firm resolve to have a thoroughly up-to-date and economical method of dealing with their customers, however, influenced Herbert & Company to make further investigations.

The result was a 13-day Commer truck demonstration during the latter part of last winter. Careful figuring showed that 772 tons of coal were hauled during that period at a cost of less than six cents per ton-mile. This demonstration was so satisfactory that the coal company bought its first 6½-ton Commer on April 18, at the same time (in a letter to Wyckoff, Church & Partridge, Inc., of New York) saying: "We sincerely trust that you may live up to this record, as it will eliminate one of the greatest problems in the coal industry."

A trifle over four months later, on August 28, came the second order for a 6½-ton Commer with a letter stating that the first machine had fully lived up to the unusual record made during the trial demonstration. Then on November 11 came the third order.

It takes time to displace horses and horse-drawn vehicles, but this coal firm has now found it possible to supplant still further its former system of delivery by giving a lump order for five more 6½-ton Commers.

Although this machine has been on the market but a comparatively short time, 55 per cent of the concerns who have purchased them have given re-orders.



The Hele Shaw clutch.

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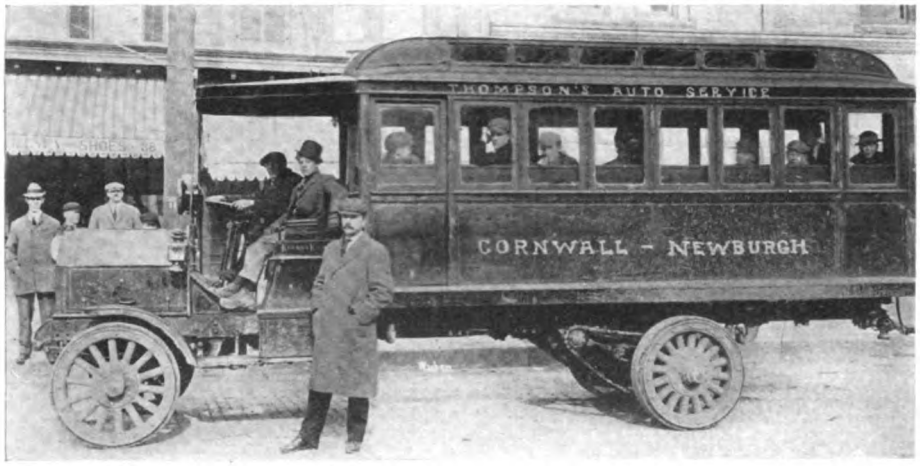


The New England Kissel Kar motor bus for winter service between Cornwall and Newburgh, N. Y. This motor bus line will be operated regularly during the entire winter.

RUTENBER OILING SYSTEM.

An efficient oiling system is one which positively provides sufficient oil for the proper lubricating of all bearings and reciprocating parts. Such a system is incorporated in the Rutenber motors built by the Western Motor Company, of Marion and Logansport, Indiana, and is known as the Rutenber force feed constant level system.

Oil is supplied to a reservoir through a breather or vent pipe located on the right or magneto side of the motor. This reservoir is a separate apartment cast integral with the lower half of the crank case, and holds two gallons.

Oil is circulated by means of a positive gear pump located in the lower half of the crankcase and driven from an auxiliary shaft by a worm gear integral with timer shaft.

The pump is entirely submerged in oil and takes oil through a fine wire mesh screen separating all foreign matter from the oil which is forced through a brass tube encircling the cranckcase. By means of small holes oil is distributed evenly to each of the connecting rod pits where oil is kept at a constant fixed level, thus allowing the connecting rod to dip into the oil at every revolution.

The level is maintained by large openings in the side of the case. The overflow of oil is carried through these openings back into the reservoir. The oil may be drained from the connecting rod pits by removing a pipe plug, or from the reservoir by removing another plug. This system has the following advantages: No leaky pump or pipe connections; oil is kept clean and free from dust and dirt, absolutely quiet, rigidly supported; even amount of oil at all times, eliminating smoking and carbonizing; liberal supply of oil at all times; and accessible sight gauge to determine amount of oil in reservoir.

The oil system is incorporated in all of the Rutenber models and has been used successfully for the past eight years.

BAKER CONVENTION.

One of the strongest ways of maintaining an efficient organization is by the convention method.

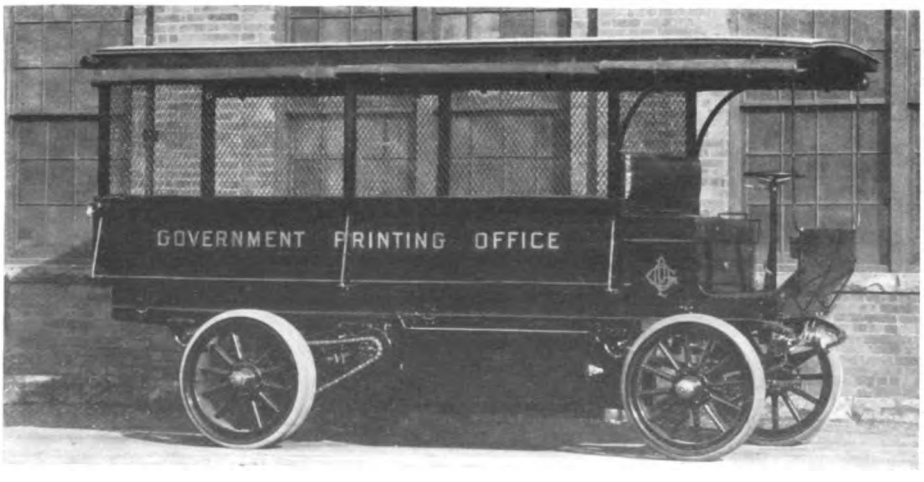
The Baker Motor Vehicle Company, of Cleveland, Ohio, believes in carrying on its business in the most up-to-date manner and appreciates the fact that its salesmen and representatives are important factors in its organization.

During the first week in December last, a convention of motor wagon salesmen was held at the factory at Cleveland. Representatives were present from various parts of the country, including New York, Boston, Chicago, Buffalo and Newark, and three days were spent very pleasantly at the Baker factory.

The first day was devoted to the different problems which confront salesmen in the field. Information was exchanged and discussed pertaining to Baker installations now in use. Later, considerable time was devoted to the study of the many improved features in the design and construction of Baker electric motor wagons.

Of particular interest was the contract for 50 two-ton electric wagons for the American Express Company, for New York City use, which were in process of manufacture. Another large order just started in which further interest was shown was one for 20 light machines ordered by the St. Paul Bread Company, of St. Paul, Minn.

The convention ended with a banquet at the Hollenden, at which Geo. H. Kelly, manager of the commercial department, announced his six-week trip to Europe to study transportation problems and obtain data regarding electric motor wagons operating in European service. Mr. Kelly sailed on Saturday, December 2, and will probably return with this information in time for the New York Show at Madison Square Garden, January 15 to 20.



Baker electric in service of the U. S. Government Printing Office.

POSITIVE MILEAGE RECORDER.

No one line of accessory manufacture has had a greater bearing upon the automobile industry as a whole than that of speed and mileage recording devices—intricate yet simple—complicated yet positive. The mileage a car travels is the kernel to the whole nut of solving wear and tear and general up-keep expenses—so vital to this commercial detail age.

And in this connection the Veeder Manufacturing Company of Hartford, for years prominent with its counters and speed indicating devices, jumps prominently to the fore with a perfected instrument for recording the mileage a motor vehicle travels, both backward and forward.

No longer can the mileage a car makes be subtracted by running the wheel backward. There is no way to disconnect it by slipping gears out of mesh. It is arranged to be sealed on the hub, in place of the regular hub cap and cannot be taken off without the owner's knowledge.

The Veeder hub odometer places within reach of the trade in one fell swoop exactly the means for obtaining the information it has been seeking for years. In the taxicab and motor wagon industry, in which upkeep cost has such a vital bearing upon its very being, the hub odometer comes in the nature of a revolution. Oil and gasoline, life of batteries, tire cost, can be accurately figured out to the smallest fraction as every revolution of the wheels, both backward and forward, is recorded.

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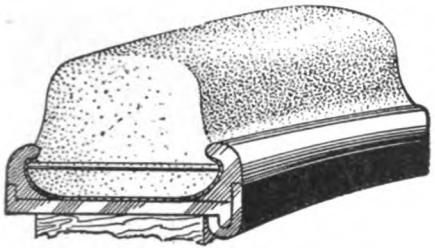
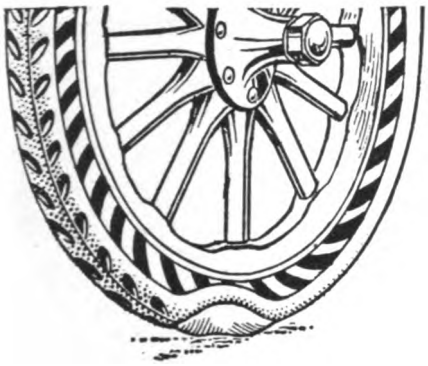
MOTZ TIRE GUARANTEE.

The cushion tire made by the Motz Tire & Rubber Company, of Akron, Ohio, is meeting with such success on motor wagons that the company is issuing to each purchaser of a set of Motz cushion tires an absolute guarantee—a specific, written document—for 10,000 miles, two years' service. The company will furnish copies of this guarantee to possible purchasers on application.



Motz quick detachable solid tire.



Motz quick detachable light delivery tire, absorbing obstacle on road.

This must not be taken to mean that the Motz tire is good for only 10,000 miles of service. The average is over 15,000 miles. Many sets have gone 20,000 miles. And one user obtained even 24,000 miles out of his Motz tires.

The Motz cushion tire combines the durability of the solid tire with the resiliency of the pneumatic. The theory of the design will easily be understood by a consideration of the accompanying illustrations.

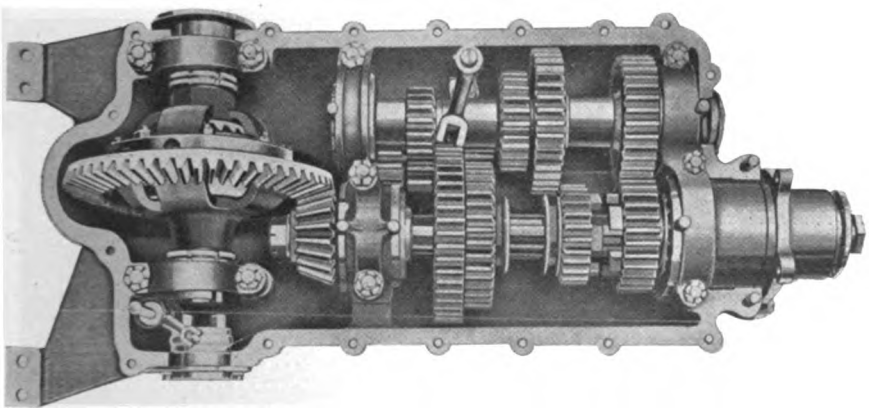
"EDISON" AT N. Y. SHOW.

The Edison Storage Battery Company will occupy space No. 237 at the Madison Square Garden Automobile Show, New York, January 6 to 20, 1912. A new feature of the Edison exhibit will be the large cells, types "A-10" and "A-12", rated at 375 and 450 ampere-hours respectively, for use in electric motor wagons of from three to 5 tons capacity. These cells are similar in most respects to the standard A-4 cell but contain a greater number of plates and are built in heavier nickel steel containers. Separator for gas exhaust and filling opening have been combined in this cell, making only one opening, besides the terminals, in the cover.

The company will also exhibit a new cell of the "B" type, the "B-6," having 120 ampere-hours capacity. No radical changes have been made in the construction of the Edison cell during the past year and it may now be considered thoroughly standardized. The company is now manufacturing large quantities of all standard sizes from 40 to 450 ampere-hours capacity. All cells are now assembled in an improved tray in which each cell rests on a pressed steel cradle and is held in position by a pressed steel hold-down.

Edison type "A-12" storage battery, 450 ampere-hours capacity, for 4 and 5-ton electric motor wagons.

5-7 Ton Truck Transmission and Differential Unit



OPEN VIEW—Model 51 for 5-7 Ton Truck, Showing Differential Locking Device.

¶ Designed for 3-point suspension. Entire transmission carried in lower half of case. Timkin bearings. Gears of nickel steel, 5 pitch, 1½ inch face.

¶ Four speeds are provided, the direct drive being on the third speed, the fourth giving the advantage of a speed faster than the engine for use when the truck is running light.

¶ The reduction at the differential is 3 to 1, being accomplished by bevels of 2-inch face, four pitch teeth. Jackshafts extending into the differential are four-splined and carry on the right-hand side, housed within the transmission case, a DIFFERENTIAL LOCK which temporarily will suspend the function of the differential. One of the desirable features is the provision for secure locking of every adjustment or movable part. Careful provision has been made for protection against oil leakage.

3-point Suspension.

WRITE FOR DESCRIPTIVE PAMPHLET

THE WARNER GEAR COMPANY

MUNCIE, INDIANA

Please mention the "Power Wagon" when writing to advertisers.

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Continental Motor Mfg. Co	4
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Dart Mfg. Co	107
Dayton Auto Truck Co	66-67
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Detroit Steel Products Co	135
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Edison Storage Battery Co	139
Federal Motor Truck Co	17
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Gibney, James L. & Bro	18
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Gould Storage Battery Co	127
Grabowsky Power Wagon Co	121
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Harwood-Barley Mfg. Co	109
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Knox Automobile Co	135
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Lauth-Juergens Motor Car Co	70-71
Lee, Henry, Power Co	5
Lippard-Stewart Motor Car Co	23
Livingston Radiator Co	142
Lyon Non-Skid Co	122
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Mais Motor Truck Co	125
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New Haven Truck and Auto Works	129
Packard Motor Car Co	144
Park Drop Forge Co	132
Peerless Motor Car Co	Cover
Perfection Spring Co	2
Pierce-Arrow Motor Car Co	3
Piggins Motor Car Co	120
Polack Tyre Co	30
Positive Lock Washer Co	141
Remy Electric Co	120
R. I. V. Co	16
Ross Gear & Tool Co	8
Standard Roller Bearing Co	110
Schwartz Wheel Co	114
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Wilcox Motor Car Co	119
Williams, J. H., Co	121
Western Drop Forge Co	107
Western Motor Co	112

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THE POWER WAGON

¶ Our FEBRUARY Number will be the most important of the year. It will also be the biggest and the most enlightening.

¶ It will be the best buyers guide for 1912. Its classified tables of motor wagon manufacture (arranged by load rating) will be revised, enlarged and made complete in every particular. Compared with them *other tables of manufacture will seem like counterfeits.*

¶ These tables, forming a digest of hundreds of catalogues, will be invaluable to agents and merchants.

¶ It is well known that the "Power Wagon" prints more useful information pertaining to mechanical road haulage than can be obtained from any other source, public or private. The accuracy and extent of this information is the result of seven years of specialized effort.

¶ If you are not a subscriber to the "Power Wagon" you are out of touch with much that would be of benefit to you.

¶ The Advertising Pages of the "Power Wagon" are a Continuous Show of the Industry.

¶ Advertisements intended for our February issue should be sent to office of publication as early as possible.

Subscriptions Received at { "PALACE" SHOW—Space, B2, Third Floor.
"GARDEN" SHOW—Space, 556, Basement.
CHICAGO SHOW—Space, Section 23, Gallery, First Reg. Armory.

THE POWER WAGON McCormick Building, CHICAGO
(ESTABLISHED 1904(

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CLASSIFIED BUYERS' GUIDE

Prepared for the convenience of buyers of motor wagons, parts and equipment. All the concerns listed under the various headings advertise regularly in the "Power Wagon."

AUTOMATIC MACHINERY.

Cleveland Auto Machine Co., Cleveland, O.

AXLES.

Driggs-Seabury Ordnance Co., Sharon, Pa.
Sheldon Axle Co., Wilkes-Barre, Pa.
Timken-Detroit Axle Co., Detroit, Mich.
Torbensen Gear & Axle Co., Bloomfield, N. J.

BEARINGS (Ball).

Barthel, Daly & Miller, New York City, N. Y.
New Departure Mfg. Co., Bristol, Conn.
R. I. V. Co., New York City, N. Y.

BEARINGS (Roller).

Bower Roller Bearing Co., Detroit, Mich.
Hyatt Roller Bearing Co., Detroit, Mich.
Standard Roller Bearing Co., Philadelphia, Pa.
Timken Roller Bearing Co., Canton, Ohio.

BEARING BRONZE.

American Bronze Co., Berwyn, Pa.

CHAINS.

Baldwin Chain & Mfg. Co., Worcester, Mass.
Culver-Taylor Chain Works, Detroit, Mich.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
H. Hoffnung & Co., New York City, N. Y.
Whitney Mfg. Co., Hartford, Conn.

CLUTCHES.

Merchant & Evans Co., Philadelphia, Pa.

DIFFERENTIALS.

Cullman Wheel Co., Chicago, Ill.
Ross Gear & Tool Co., Lafayette, Ind.

DROP FORGINGS.

Park Drop Forge Co., Cleveland, O.
Western Drop Forge Co., Marion, Ind.
J. H. Williams Co., Brooklyn, N. Y.

DUMPING BODIES (Power Hoist).

Duffey Bros. Co., San Francisco, Cal.

ELECTRIC CURRENT.

Commonwealth Edison Co., Chicago, Ill.

ELECTRIC WELDING.

Standard Welding Co., Cleveland, O.

ELECTRIC WAGONS AND TRUCKS.

Anderson Electric Car Co., Detroit, Mich.
Baker Motor Vehicle Co., Cleveland, Ohio.
Couple Gear Freight Wheel Co., Grand Rapids, Mich.
General Motors Truck Co., Detroit, Mich.
General Vehicle Co., Long Island City, N. Y.

GASOLINE ENGINES.

Continental Motor Mfg. Co., Muskegon, Mich
Hazard Motor Mfg. Co., Rochester, N. Y.
Syracuse Gear Co., Syracuse, N. Y.
Western Motor Co., Marion, Ind.
Wisconsin Motor Mfg. Co., Milwaukee, Wis

GAS-ELECTRIC WAGONS AND TRUCKS.

Couple Gear Freight Wheel Co., Grand Rapids, Mich.

GASOLINE WAGONS AND TRUCKS.

Adams Bros. Co., Findlay, Ohio.
Alden Sampson Mfg. Co., Detroit, Mich.
American Locomotive Co., New York City.
Avery Company, Peoria, Ill.
Bowling Green Motor Car Co., Bowling Green, Ohio.
Cameron Car Co., Beverly, Mass.
Chase Motor Truck Co., Syracuse, N. Y.
Clark Delivery Car Co., Chicago, Ill.
Commerce Motor Car Co., Detroit, Mich.
Dart Mfg. Co., Waterloo, Ia.
Dayton Auto Truck Co., Dayton, Ohio.
Decatur Motor Car Co., Decatur, Ind.
Federal Motor Truck Co., Detroit, Mich.
Ford Motor Co., Detroit, Mich.
General Motors Truck Co., Detroit, Mich.
Grabowsky Power Wagon Co., Detroit, Mich.
Gramm Motor Truck Co., Lima, Ohio.
Harwood-Barley Mfg. Co., Marion, Ind.
Henry Lee Power Co., Chicago.
Ideal Auto Co., Fort Wayne, Ind.
International Motor Co., New York City, N. Y.
Johnson Service Co., Milwaukee, Wis.
Kelly Motor Truck Co., Springfield, Ohio.
Kissel Motor Car Co., Hartford, Wis.
Knickerbocker Motor Truck Mfg. Co., New York City, N. Y.
Knox Automobile Co., Springfield, Mass.
Lauth-Juergens Motor Car Co., Fremont, O.
Lippard-Stewart Motor Car Co., Buffalo.
Mais Motor Truck Co., Indianapolis, Ind.
Mercury Mfg. Co., Chicago, Ill.
Motor Wagon Co. of Detroit, Detroit, Mich.
National Motor Truck Co., Bay City, Mich.
New Haven Truck & Auto Works, New Haven, Conn.
Packard Motor Car Co., Detroit, Mich.
Peerless Motor Car Co., Cleveland, Ohio.
Pierce Arrow Motor Car Co., Buffalo, N. Y.
Piggins Motor Car Co., Racine, Wis.
Seitz Auto & Transmission Co., Detroit, Mich.
Speedwell Motor Car Co., Dayton, Ohio.
Universal Motor Truck Co., Detroit, Mich.
Velie Motor Vehicle Co., Moline, Ill.
Victor Motor Truck Co., Buffalo, N. Y.
Waverley Co., Indianapolis, Ind.
Wilcox Motor Car Co., Minneapolis, Minn.
W. H. McIntyre Co., Auburn, Ind.

LOCK WASHERS.

Positive Lock Washer Co., Newark, N. J.

LUBRICANTS.

Jos. Dixon Crucible Co., Jersey City, N. J.
Standard Oil Co., New York City, N. Y.

LUBRICATORS.

Detroit Lubricator Co., Detroit, Mich.

MAGNETOS.

Bosch Magneto Co., New York City, N. Y.
Remy Electric Co., Anderson, Ind
Simms Magneto Co., New York City, N. Y.
C. F. Splitdorf, New York City, N. Y.

MOTOR FIRE VEHICLES.

American La France Fire Engine Co., Elmira, N. Y.

NON-SKID DEVICES.

Lyon Non-Skid Co., Philadelphia, Pa.
Atlas Chain Co., Brooklyn, N. Y.

PRESSED STEEL FRAMES.

Driggs Seabury Ordnance Corp., Sharon, Pa
Hydraulic Pressed Steel Co., Cleveland, O.
A. O. Smith Co., Milwaukee, Wis.

RADIATORS.

Briscoe Mfg. Co., Detroit, Mich.
Harrison Radiator Co., Lockport, N. Y.
W. J. Kells Mfg. Co., New York City, N. Y.
Livingston Radiator Co., New York City.

RECORDING INSTRUMENTS.

Veeder Mfg. Co., Hartford, Conn.

SCREW MACHINE PARTS.

National Cycle Mfg. Co., Bay City, Mich.

SEAMLESS STEEL TUBING.

Standard Welding Co., Cleveland, Ohio.

SIGNAL HORNS.

Automobile Supply Mfg. Co., Brooklyn, N. Y.

SPARK PLUGS.

Emil Grossman Co., New York City, N. Y.

SPRINGS.

Detroit Steel Products Co., Detroit, Mich.
Perfection Spring Co., Cleveland, Ohio.
Spring Perch Co., Bridgeport, Conn.

SPROCKETS.

Cullman Wheel Co., Chicago.

STEERING GEARS.

Lavigne Gear Co., Detroit, Mich.
Muncie Gear Co., Muncie, Ind.
Ross Gear & Tool Co., Lafayette, Ind.

STEEL TANKS.

Air-Tight Steel Tank Co., Pittsburg, Pa.

STORAGE BATTERIES.

Edison Storage Battery Co., Orange, N. J.
Gould Storage Battery Co., New York City.

TIRES (Pneumatic).

Diamond Rubber Co., Akron, O.
Firestone Tire & Rubber Co., Akron, O.
B. F. Goodrich Co., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Kelly Racine Rubber Co., Racine, Wis.
Swinehart Tire & Rubber Co., Akron, O.
U. S. Tire Co., New York City, N. Y.

TIRES (Solid).

Consolidated Tire Co., New York City.
Diamond Rubber Co., Akron, O.
Firestone Tire & Rubber Co., Akron, O.
Jas. L. Gibney & Bro., Philadelphia, Pa.
B. F. Goodrich Co., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Kelly Racine Rubber Co., Racine, Wis.
Motz Tire & Rubber Co., Akron, O.
Polack Tyre Co., New York City, N. Y.
Swinehart Tire & Rubber Co., Akron, O.
U. S. Tire Co., New York City, N. Y.

TRANSMISSIONS.

Cameron Car Co., Beverly, Mass.
Covert Motor Vehicle Co., Detroit, Mich.
Driggs Seabury Ordnance Corp., Sharon, Pa.
Hazard Motor Mfg. Co., Rochester, N. Y.
Muncie Gear Co., Muncie, Ind.
New York Gear Works, Brooklyn, N. Y.

UNIT POWER PLANTS.

Hazard Motor Mfg. Co., Rochester, N. Y.

UNIVERSAL JOINTS.

Blood Bros. Machine Co., Kalamazoo, Mich.
Spicer Mfg. Co., Plainfield, N. J.

WHEELS.

Hayes Wheel Co., Jackson, Mich.
Schwartz Wheel Co., Philadelphia, Pa.

WHEEL MAKING MACHINERY.

Defiance Machine Works, Defiance, O.

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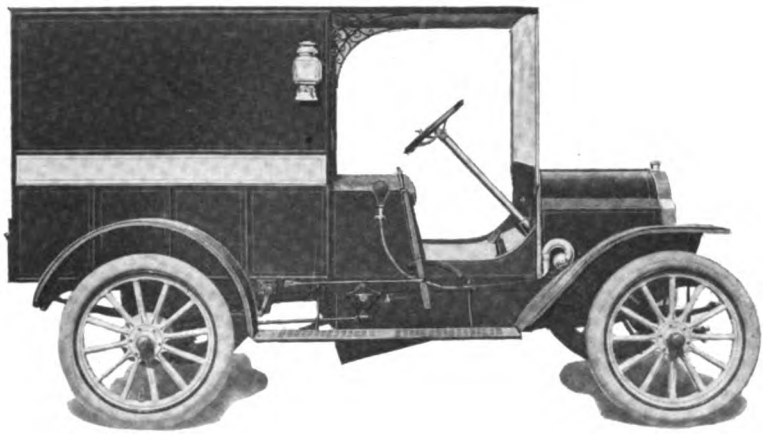
Here Is the 1912 Sensation of the Motor World



Panel Body; Four Cylinder, 20 H. P. Motor; Bosch High-Tension Magneto; Pneumatic Tires, 32x3½ Inches—Price Complete, $850.00. Solid 2½ Inch Truck Tires—Price Complete, $800.00.

COMMERCE CAR

Dealers in all parts of the country are already reaping a harvest from sales of the Commerce Car.

We have some choice territory left for good, active dealers.

Do not let this great opportunity pass you by.

Read what a prominent dealer has to say about the Commerce Car and then write us for territory and dealer's proposition.

"EVERITT" DISTRIBUTORS INTER-STATE COLUMBUS ELECTRICS

Inter-State Sales Company

M. O. KOPPERL, President

SALESROOM—2216 Postoffice, Phone 3323 GALVESTON, TEX. OFFICE—City Nat'l Bank, Phone 52

December 20th, 1911.

Commerce Motor Car Co., Detroit, Mich.

Gentlemen:

You will probably be interested to know of our experiene with the Commerce Delivery Wagon, last night.

In unloading a carload of machines we were cut off by a line of railroad cars, and attempted to drive across the railroad track with a five-passenger touring car. It was getting rather dark and we got the front end of the car into the ditch, practically having the car standing on end. We could not see as to how to get it out, as we did not have any block or tackle or any outside assistance, when we happened to think of the Commerce.

We immediately returned to the garage, took the little Commerce, with a good big tow rope, and returned to the scene of the battle. We first tried to pull it out with about twenty big freight hands, but could not move it an inch. We hooked the little Commerce to the end of the rope and we pulled the car, ditch and all, out. We expected to find the little Commerce torn into chips this morning, but upon examination of the Commerce, found the little fellow was in first-class shape, and we certainly wish to compliment you on putting out one of the most wonderful little cars that I have ever seen in my twelve years' experience in the automobile business, and trust that our future relations will be of the very best, and wishing you all success in the world, we are, Yours very truly,

HR-F INTER-STATE SALES COMPANY, per (signed) H. Endicott.

The Commerce Motor Car Company

General Office: 634-640 Penobscot Bldg., - Detroit, Michigan

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HUB ODOMETER

THE VEEDER HUB ODOMETER solves the perplexing problem of recording the TRUE mileage of any motor-propelled vehicle, in that it POSITIVELY CHECKS DISTANCE TRAVELED BACKWARD AS WELL AS FORWARD.

You or yours can't fool it — it cannot be disconnected by slipping gears out of mesh — the record the Hub Odometer makes "goes," as it cannot be tampered with — it is impossible to subtract mileage by running the wheel backward or to falsify returns by putting the Odometer out of service during a run,

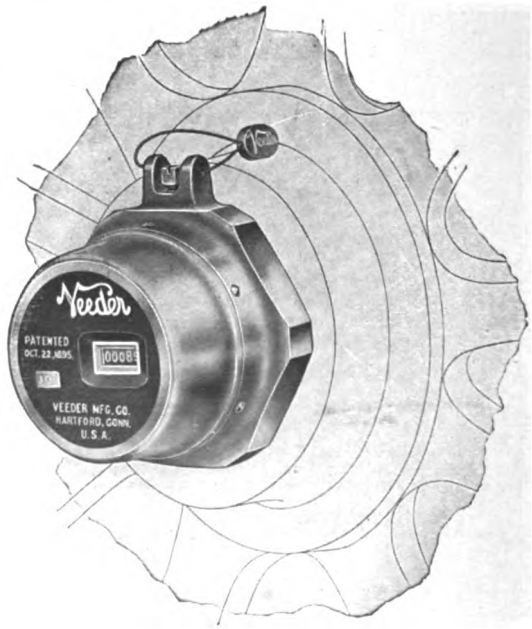
Affording an infallible check on "joy-riding" and an absolute tally of tire mileage with pleasure cars, the VEEDER HUB ODOMETER is a PLAIN NECESSITY for commercial trucks and taxicabs. With its use tire, oil and gasoline consumption, and wear and tear can be accurately checked, for comparative purposes, and the dishonest or careless driver is "nailed" by the record.

Neat, durable and compact, it can be easily attached. Price, complete . . . At your dealers, direct from our factory or at the following agencies: **$25.00**

T. H. Cranston & Co., 56 E. Randolph St., Chicago, Ill.

L. H. & B. I. Bill, 543 Golden Gate Ave., San Francisco, Cal.

The Rubber Tire Wheel Co., Montreal, Quebec, Toronto, Winnipeg and Vancouver.



The Veeder Manufacturing Company

C. H. VEEDER, President D. J. POST, Treasurer
H. W. LESTER, Secretary

HARTFORD, CONN.

Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Small Die Castings.

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Here's Just a Hint of What This Delivery Car Means to YOU:

One of our local merchants, here in Waterloo, Iowa, was in the habit of using five or six horse-drawn vehicles on busy days. Just before one of the holidays last year, he called us up and asked if we could rent him a Dart Delivery Car—as he had a large business and was afraid he couldn't handle it with the horses.

Our man was on the job at 6:30 in the morning and worked until 9:30 that night, making during that time 521 stops. On this wagon of ours there was one boy doing the delivering and our man running the machine. They handled all the business on one side of the river. On the other side this merchant had three horse-drawn outfits doing the work, all of which were equipped with two men, working the same number of hours as our wagon did, and the whole three outfits only made 315 stops. Here is a comparison that is worth considering as our machine did considerable more work than three horse-drawn outfits and six men. During the 13½ hours of running, we consumed about six gallons of gasoline. The

$650 COMPLETE
Other styles at equally attractive prices. Write for FREE BOOK.

"DART" Light Delivery Car

is truly a wonder for quick, economical deliveries. We will gladly send you the merchant's name and address.

The Dart will prove itself a most valuable asset in **your** business. It is cheaper than horses, capable of doing three to five times the amount of work in much less time than teams and wagons could accomplish. More powerful and dependable than horses—don't grow old and worn out—requires attention only when doing its good work—costs less to feed than horses—can carry heavy loads miles beyond the city limits and be back again for another load while the horses and wagons are just getting started. Only one man—drawing one salary—is required to run the Dart Delivery Wagon, while three or four men must be paid to drive the teams and wagons that do the same work. Time, labor, business and money is saved—no consignment ever need be late. Capacity 1,000 pounds. 50 per cent overload.

Write us today for further information, telling just how the Dart Delivery Wagon will increase your business—your customers and your bank account. This and catalog sent free upon request.

Dart Manufacturing Company, Dept. W., Waterloo, Iowa

NOTE: See the "Dart" at the New York Licensed Automobile Show. (Tear this "ad" out to remind you.)

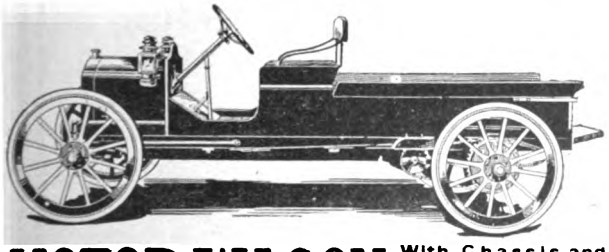
The Clark Delivery Car

A specially designed one-ton capacity truck—not a "converted" pleasure car. Four cylinder, 30 h. p. motor. Full floating rear axle. Shaft drive. All moving parts enclosed and all parts interchangeable.

Send for illustrated catalog.

We will exhibit at the Chicago Show.

Clark Delivery Car Co.
Grand Crossing CHICAGO, ILLS.



MOTOR WAGON DETROIT With Chassis and Magneto Equipment **$610**

A cheap, reliable and efficient Motor-Wagon for delivery purposes.
Will do the work of a two-horse-and-wagon outfit and at less cost.
Simple to operate and is repair proof.
Reliable agents should write for unoccupied territory.

The Motor-Wagon Company of Detroit, Mich., Dept. M

Western Drop Forge Company

Manufacturers of

Drop Forgings, Steel Tanks, Heaters, Smoke Stacks and Sheet, Plate and Structural Iron Work of Every Description

Special attention to quality and first-class service at all times. Largely increased facilities enable us to insure prompt deliveries. Send us blue prints and let us figure on your requirements.

Western Drop Forge Company
Marion, Indiana

Please mention the "Power Wagon" when writing to advertisers.

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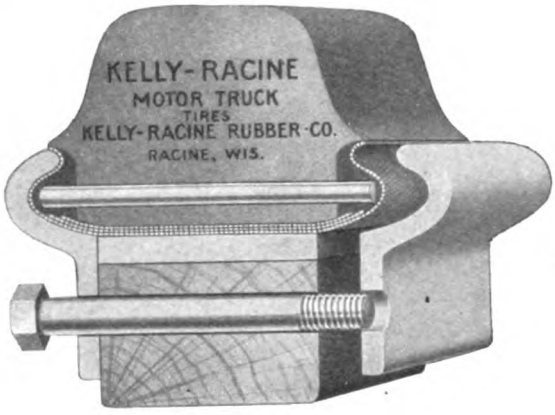

Note how the cross wires are imbedded in the "hard Rubber" Bead insuring

"Positive Security of Fastening"

Take off your Pneumatics

Apply Kelly-Krotz Tires on same rims

WRITE DEPT. "T" FOR PRICES AND FULL PARTICULARS

Kelly-Racine Rubber Co., - Racine, Wis.

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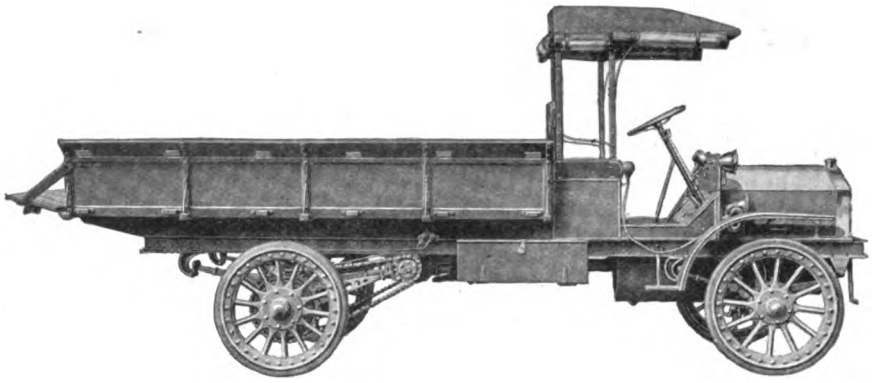
We Shall Exhibit at Chicago Show February 5-10



AGENTS Wanted.

Some good territory still open.

"INDIANA"=Trucks

ARE NO EXPERIMENT

Since the Motor Truck has passed the experimental stage, hard-headed business men are convinced of the absolute superiority of trucks over the horse and wagon—in service, durability and economy.

"INDIANA" Trucks are "sturdy boys," built for service and efficiency, with low cost of maintenance, are models of strength, and develop remarkable power. Every part is standard—TRIED and TESTED.

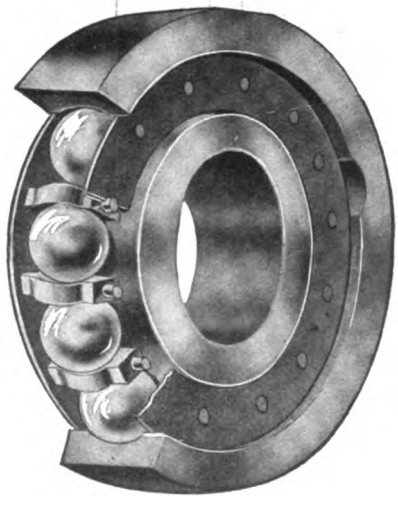
DON'T EXPERIMENT

Capacity, 1 to 1½ tons. Bodies furnished suitable for any line of business. Send for catalog.

Harwood-Barley Mfg. Co., 200 Henderson Ave., Marion, Ind., U. S. A.

"SCHAFER" BALL BEARINGS

MADE IN GERMANY



¶ **"SCHAFER"** Ball Bearings are made of the finest extraordinarily dense crucible cast steel of special analysis, and carefully glass-hardened in the most painstaking manner by the most modern and accurate machinery, under the personal supervision of experts at our factories in Schweinfurt.

¶ Each ball bearing of the **"SCHAFER"** silent type contains one less ball than the full type radial bearings, whereas some other silent type radial bearings only contain sufficient balls to fill little more than half the entire ball race. It is obvious that the more balls the bearing contains, the more merit and greater carrying capacity the bearing enjoys.

¶ If there be merit to any ball bearing made, then the **"SCHAFER"** Ball Bearings are the most meritorious made, and can be measured by no other standard than their own.

BARTHEL, DALY & MILLER

Sole Importers

42 Broadway **New York**

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AMERICAN MADE

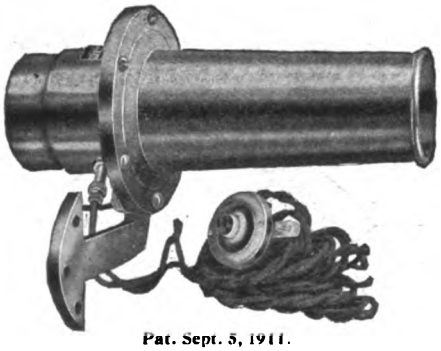
STANDARD SRB BEARINGS

are as much superior to the imported kinds as American Cars are to foreign cars.

Standard Taper Roller Bearings are especially adapted to commercial vehicle construction, as they possess many distinctive features not found elsewhere.

If You Can Buy the Best, Insist on Standard Bearings.

STANDARD ROLLER BEARING COMPANY
PHILADELPHIA



Pat. Sept. 5, 1911.

THE LATEST "NEWTONE"

MADE IN THREE STYLES

"The Mile Away Motor Horn"

Standard Equipment for 1912 Cars

TORPEDO TYPE

A Beauty Just Out

Price $20.00 COMPLETE, INCLUDING BUTTON and CABLE.

ONCE HEAR THIS HORN AND YOU'LL NEVER USE ANY OTHER

EFFICIENCY—ECONOMY—STYLE

All embodied in this horn. Its agreeable warning note, powerful as the roar of a cannon, eliminates all worry of accidents.

The fields of our NEW MOTOR are made up of 75 very thin disks of special steel, thoroughly insulated—this new field construction produces **more power** with **less current** consumption.

Other signals having motor with solid cast iron fields require nearly 50% more current for the same power, and what is more to be noted is that your storage battery will be ruined by being forced to discharge more amperes than the capacity of the battery will stand—ask the electrician, and he will prove it to you.

The NEWTONE Horn has been so perfected, that the harsh, disagreeable sound so common in other Horns, has been entirely eliminated.

Its tone is clear, sweet and musical, yet so powerful that it can be heard a mile away. It warns without startling.

If your dealer does not carry the Newtone, let us send you one on approval.

If not entirely satisfactory, return at our expense.

AUTOMOBILE SUPPLY MANUFACTURING COMPANY
220 Taaffe Place, near De Kalb Avenue **BROOKLYN, N. Y.**

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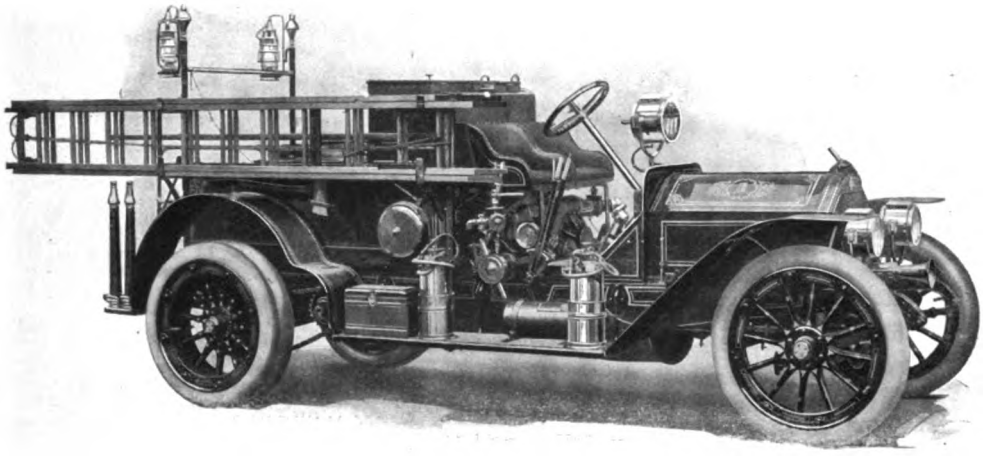
MOTOR FIRE APPARATUS

STRENGTH — POWER — BALANCE

Salvage Corp Cars

Hose Cars



Straight Chemical Engine Cars

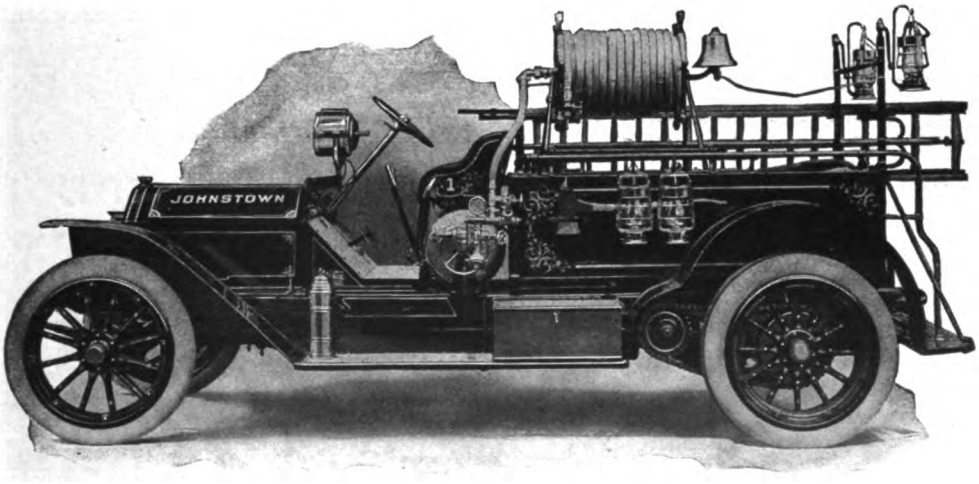
Police Patrol Cars

Combination Pumping Engine and Hose Motor Car

Motor Driven Aerial Trucks

Motor Driven City Service Trucks

Combination Chemical and Hose Cars



Combination Pumping Engine and Hose Cars

Combination Chemical Engine and Hose Motor Car

BUILT BY

AMERICAN-LAFRANCE FIRE ENGINE CO.

ELMIRA, N. Y.

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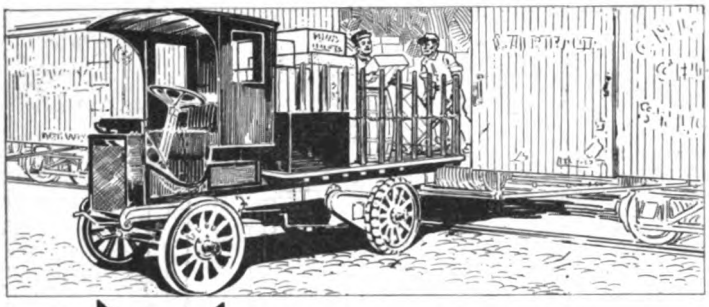

From Start to Finish

The problem of economical hauling is solved and the line of deliveries is straightened by the power wagon that is free from motor troubles. No matter whether you need a truck capable of hauling the heaviest loads of bulky freight, coal, ores, iron or general merchandise, or whether you require a light, swift-running delivery car for retail work,

THE RUTENBER MOTOR

should throb under your hood. It means efficiency, endurance, rugged honesty of service, economy of maintenance and unfailing power. For high speed or low, for heavy work or light, or for combination uses, the Rutenber Motor is the motor of performance.

More than a score of the highest grade cars in America to-day are equipped with Rutenber Motors. The best of trucks are those which place their reliance on the Rutenber.

Send for Booklet.

The Western Motor Co.
Marion, Ind.

B. E. BAKER says:
"I did the work of three teams and three men with my Avery truck at a cost of 1 man and 1 horse"

He was hauling from his farm to town, a round trip of 21 miles.

AVERY MOTOR TRUCKS

will haul either in the city or country. They are equipped with solid rubber tires or our special wood plug tires. No other truck is fitted for so many kinds of work.

That's one reason why its a better truck for a dealer to se l and for a user to buy.

Ask for complete catalog, address

AVERY COMPANY, Mfg'rs
949 Iowa Street :: PEORIA, ILL.

Syracuse Transmissions

Are especially adapted for Heavy Duty Work

Our side chain drive transmissions are intended for the heaviest types of commercial cars. **Syracuse Transmissions** are adapted for any standard or special make car on the market. We make a specialty of planetary and sliding gear transmissions for shaft drive, single chain drive and double chain drive.

GUARANTEED TO GIVE SATISFACTION
WRITE US

See the **BRENNAN MODEL B** motor in connection with the Brown Tire Pump at Exhibit No. 611, Madison Square Garden, Jan. 6-13th, and at Chicago Show, Space 20 Armory Annex, Jan. 27-Feb. 3rd.

Syracuse Gear Co., Syracuse, N. Y.

LAMBERT

The Truck of a Thousand Speeds

The Friction Clutch Car; no change of gears; simple, direct transmission; fewest parts; most power at least cost. Get the facts. Interesting to agents too.

The Buckeye Mfg. Co.
164 Columbus Ave. Anderson, Indiana

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AN ENGINEERING MASTERPIECE

The New One-Ton KELLY MOTOR TRUCK

The first Motor Truck to combine proper load distribution with the motor out in front under the hood

FORMERLY it was a choice of two evils: To get proper load distribution—78% on the rear wheels and 22% on the front wheels—it was necessary to put the motor under the seat and risk the possibility of the driver neglecting it. Or, place the motor out in front under the hood and let the rear wheels carry 85% to 95% of the load—with a consequence that in plowing through mud, snow and sand, the rear wheels would bury themselves and the truck be unable to pull itself out.

This new one-ton Kelly solves the problem. The motor, perfectly accessible, out in front under the hood, where it is certain to receive the best care and attention—**and** proper load distribution (22% in front, 78% rear) maintained.

Kelly Motor Trucks have walked away with practically every important motor truck contest held during the past two years. Statements of Kelly Truck users prove the Kelly contest records to be merely samples of the every day **service** records of the Kelly. The Kelly is the master truck—and this new one-ton model is the Kelly masterpiece.

The Kelly Motor Truck is built for **your** business. We have full information on what it is doing in **your own line.** Write for this information, and ask for special **detailed** information regarding the new one-ton model.

KELLY MOTOR TRUCK COMPANY

SPRINGFIELD **OHIO**

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Schwarz Patent Spokes

Schwarz Wheels

are used on all leading Motor Trucks

Wheel for Heavy Motor Truck

Because they are STRONGEST, SAFEST and MOST ECONOMICAL; will stand up continuously under heavy strains; and are made with a first regard to quality and finish.

The construction of the SCHWARZ WHEEL alone insures its strength and durability. Spokes at the tenon are grooved and mortised, and interlock—forming an absolutely compact and immovable assemblage which cannot loosen. It is the only wheel with positive and evenly distributed spoke support.

Can be made complete and shipped without hub.

We are pioneers in the manufacture of heavy truck wheels and the largest producers. We maintain a large, fully equipped department devoted exclusively to this work and are pleased always to design and proportion wheels in proper keeping with other features of construction. Consult us.

We make Automobile Wheels exclusively—for both pleasure and commercial cars.

Write for information.

THE SCHWARZ WHEEL CO.

FRANKFORD **PHILADELPHIA**

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Waverley 3-Ton Truck

Model 83—Shaft-Driven Delivery Wagon for Retail Business

Waverley 3-Ton Truck

Why Waverley Commercial Cars Are Multiplying

THERE is a Waverley Electric Car for every business purpose. In every line where Waverleys are used they have proved the most economical means of haulage. This is why the Waverley cars are continually multiplying on the city streets.

The Shaft-Driven Delivery Wagon for retail houses—the one, two and three ton Trucks for heavy hauling—the Waverley Ambulance for hospitals and dispensaries—the Waverley Electric Hearse, the most elegant of all hearses.

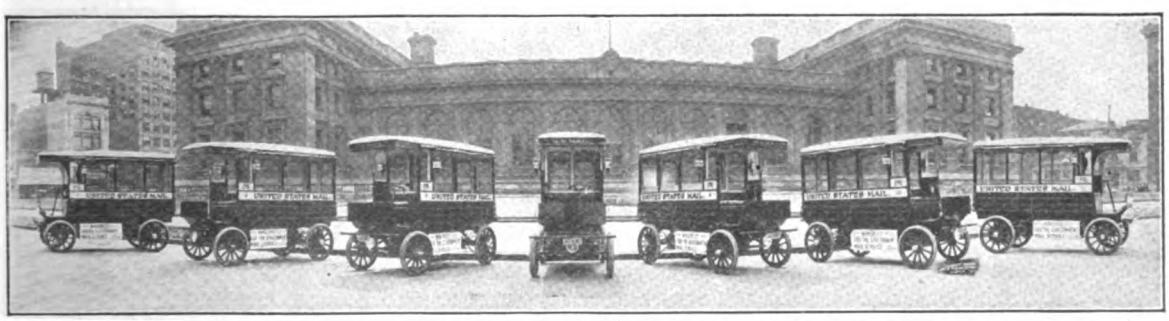
Years of comparison in actual service show the Waverley to be unsurpassed in efficiency, and unequaled in dependability for commercial use. Records and figures amply back these statements. Every man who has a problem of hauling expense is invited to write us for definite information applied to his business.

The Waverley maintenance contract protects every purchaser. We figure the limit of costs for tires, battery renewals and parts, covering a stated period of years. The Waverley Agent is prepared to give a guaranty against excess of that limit.

Write today for illustrated catalog and full particulars.

THE WAVERLEY COMPANY, 174 S. East Street, Indianapolis, Ind.

AGENTS IN PRINCIPAL CITIES



This illustration shows Waverley Electric Trucks which are being put into the U. S. Mail Service at St. Louis. Rigid Government inspection was made of each one of these cars while it was in progress of construction. Part by part, each car had to come up to Government standard. Each one of the cars specified in the contract amply fulfilled the Government's requirements. Yet there was not one "special" item in their construction. These cars are just the same in mechanical and electrical principle—in material—in workmanship—as every Waverley Truck that leaves the factory.

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Right now your truck needs non-skid, long-wearing, quick-attachable

Swinehart

CELLULAR TRUCK TIRES

For the sake of the safety and economy, you should be using Swinehart Cellular Tires on your truck.

They effectually prevent skidding under all conditions—without the aid of chains or other devices.

Service tests have shown that they may be expected to return 12,000 to 15,000 miles, instead of the usual 5,000 to 8,000 of the ordinary type of ordinary truck tire.

Both of these features are remarkable.

Both are due to the perforations in the tread.

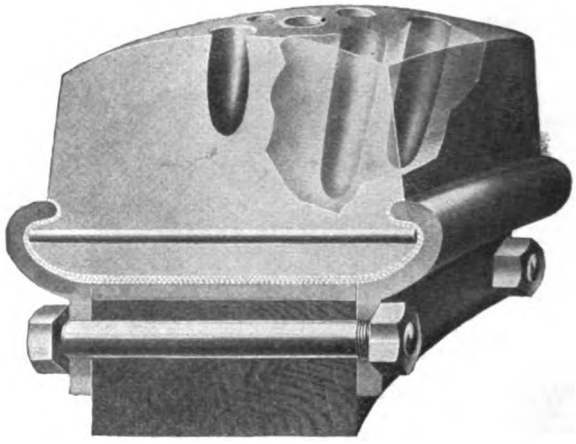
These perforations do three things which make the tire non-skidding and give it its extraordinary life.

First, they grip the road with the force and the tenacity of a vacuum. Their grip is more firm than that of chains, and they save buying new chains every week or so.

Second, they provide space for the compression or flow of the rubber as the wheel revolves. They make the tire more resilient than any solid tire can possibly be.

Third, they serve as radiators, carrying away internal heat and keeping the tire cool at all times.

They are permanent, too. They are deep—extending nearly to the fastening device—so that the non-skid effect is retained until the tire is worn out.



Sectional phantom view of the Swinehart Cellular Tire. Note the depth of the perforations; the absence of longitudinal wires; the quick-attachable flange rims—all good features peculiar to Swinehart Tires.

On top of all this—the tires fasten with the famous Swinehart quick-attachable flange rim, by which 30 minute changes are made possible.

There you have, in one tire, every essential that makes for economy, long service and safety.

And back of it all, a national reputation that is literally putting Swinehart on the best trucks and the most.

You can't ignore the weight of solid facts like these.

You can't ignore Swinehart Cellular Tires if you are looking for maximum economy and efficiency.

Madison Square Garden, New York, January 6th to 20th, Space No. 171.
Grand Central Palace, New York, January 10th to 17th, J-Space No. 2.
Chicago, Coliseum, January 27th to February 10th, Space No. 15.
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The Swinehart Tire & Rubber Company

11 North Street, Akron, Ohio

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Adams Trucks
"Deliver the Goods"

SEE A DEMONSTRATION

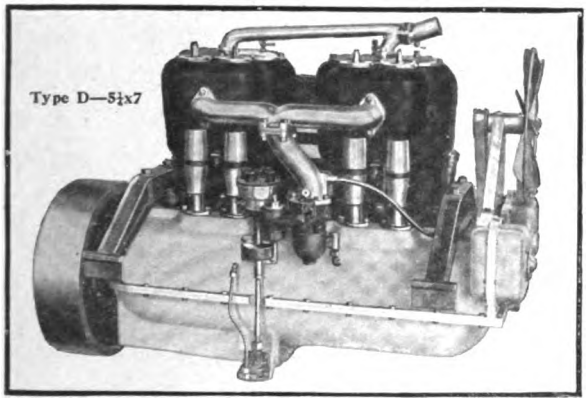
The proof of truck value is performance. The Adams Truck *at work* will show you a perfect score.

The Adams Chassis is right. It is substantial, well designed and skilfully built. The engine is particularly good. It is simple, powerful, accessible and efficient. The Truck as a whole is excellent, because every part is built for service. It is a fine looking machine, too, one of which you can be proud.

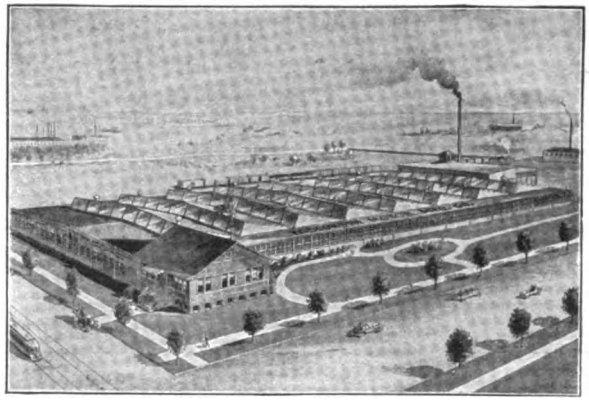
If you are not going to visit the Chicago Auto Show, write to us direct and get acquainted with the Adams Truck. "It Delivers the Goods."

THE ADAMS BROS. COMPANY, Findlay, Ohio

Wisconsin Long Stroke Motors



Made in a Modern Plant with Modern Tools and Up-to-date Methods



Especially Designed for slow speed heavy duty work

1000-2000 pounds	3¾"x5"
2 ton	4¼"x5"
3 ton	4¾"x5½"
5 ton	5½"x7"

Special Features

Long stroke
Large bearings
Perfect lubrication
Double ignition
Heavy crank shaft
Large valves
Ample water jacket
Perfect workmanship

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Wisconsin Motor Mfg. Co. Dept. 31 **Milwaukee, Wisconsin**

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SPLITDORF MAGNETO

"Always There"

You Owe It to YOURSELF

To INVESTIGATE SPLITDORF IGNITION and its application to motor trucks and commercial delivery wagons.

Motor delivery service follows the law of economics, but, with its installation, deep consideration must be given by every owner or prospective owner to the question of ignition if for no other reason than economy.

SPLITDORF IGNITION is the MOST ECONOMICAL because it is the MOST RELIABLE.

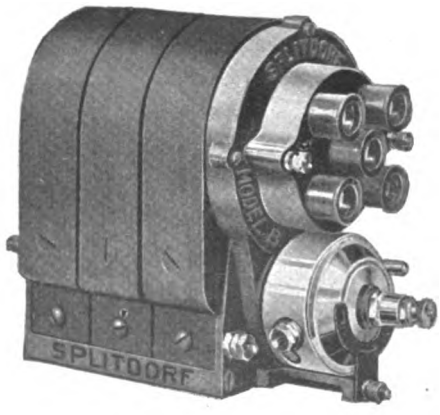
SPLITDORF IGNITION is the MOST EFFICIENT because it ALWAYS DELIVERS THE GOODS.

SPLITDORF IGNITION is the MOST PRACTICAL because you are always able to throttle down to a snail's pace with the positive certainty of starting on a quarter turn under all conditions—if you have SPLITDORF EQUIPMENT.

SPLITDORF IGNITION CHAMPIONSHIP SUCCESSES in the automobile, motorcycling, motorboating and aeroplane worlds only indicate the remarkable SPLITDORF efficiency and durability under the most severe tests.

Our SERVICE DEPARTMENT is at your disposal, so make a point of it TO-DAY to WRITE FOR INFORMATION.

Write for our Magneto Catalog



C. F. SPLITDORF

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NEW YORK

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SAN FRANCISCO	430-436 Van Ness Avenue
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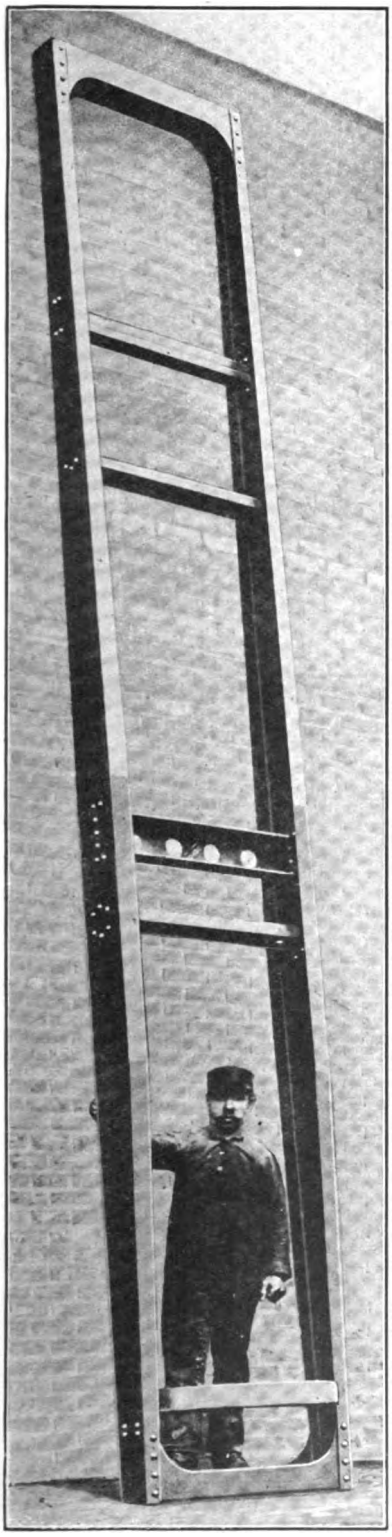
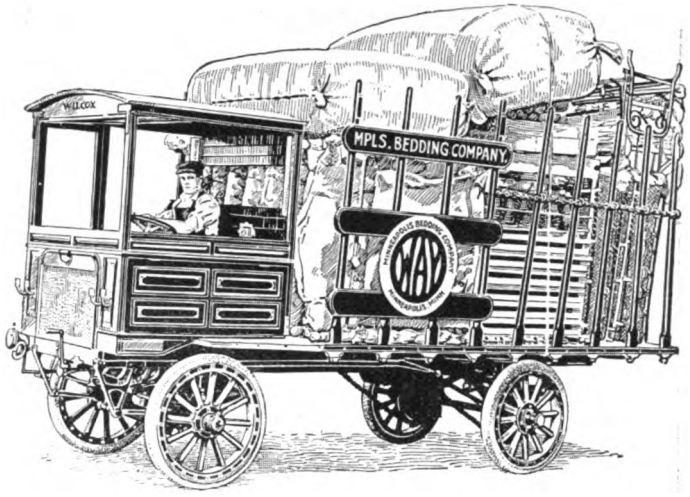


TRUCK FRAMES
½ TON TO 10 TON



Here Is Another Case Where
WILCOX TRUX
Proved a Saving Investment

THIS TRUCK MADE 1,145 MILES IN ONE MONTH at a total cost of **$25.10.** This positively covered the maintenance, including every item of operation and repairs.

DOES THE WORK OF 2½ TEAMS and at a saving of $111.25 per month over the cost of teams, drivers and maintenance. This is taken from actual records on the company's books, figured on basis of auto maintenance, $25.10; auto driver, $75.00; liberal depreciation estimated at $20.00, and team and barn maintenance of $38.00; teamsters, $52.00, and $2.50 depreciation per team.

This is only one of the many instances where Wilcox Trux have shown a profit, and at the same time increased the efficiency of the delivery service.

Let us analyze your truck problem and show you whether the same degree of saving can be applied to **your** business.

Write us to-day for catalog and diagnosis blank. **Do it now!**

H. E. WILCOX MOTOR CAR CO.
1039 Marshall Street, N. E. Minneapolis, Minn.

The Wilcox Trux agency offers a mighty attractive business opening for energetic men with a little capital. A few of the principal territories are still open. Write us for our proposition on this.

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A New Truck Grip

ANNOUNCEMENT

The ATLAS CHAIN CO. wishes to announce that they have established a Commercial Car Department for the purpose of manufacturing the Gaylor-Atlas Grip exclusively for use on solid tires.

Delivery of these grips will commence on January 15, 1912.

Being thoroughly conversant with all the requirements necessary to secure a satisfactory grip for solid tires, we can assure both the trade and the public that the Gaylor-Atlas Grip will merit their highest approval.

Requests for further information prior to public announcement should be addressed to Commercial Car Department.

EXHIBITING AT
NEW YORK
CHICAGO
BOSTON

ATLAS CHAIN COMPANY
BUSH TERMINAL BROOKLYN, N. Y.

Remy Magneto

Remy Ignition Supremacy Proven Again and Again in the World's Greatest Speed and Endurance Contests.

Specify Remy Equipment Upon Your Car

Remy Electric Co.
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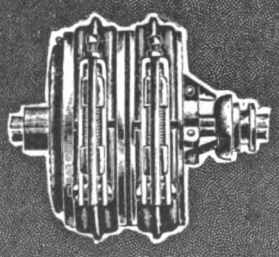
CONSTANT SERVICE

CONSTANT SERVICE

BALL
TRANSMISSION
GEARS
for
AUTOMOBILES *and*
COMMERCIAL VEHICLES



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NEW YORK GEAR WORKS
58 Greenpoint Ave., BROOKLYN, NEW YORK

THE PIGGINS MOTOR CAR CO.

of Racine, Wisconsin, manufacture a complete line of motor trucks from 1 to 10 tons capacity.

Simplicity and accessibility are the dominant features of our long stroke truck motor.

Two-ton model of Piggins Motor Car Co., Racine, Wis.

Send for catalog showing complete line of models.

Choice territory open to responsible dealers.

PIGGINS MOTOR CAR CO.
RACINE :: :: WISCONSIN

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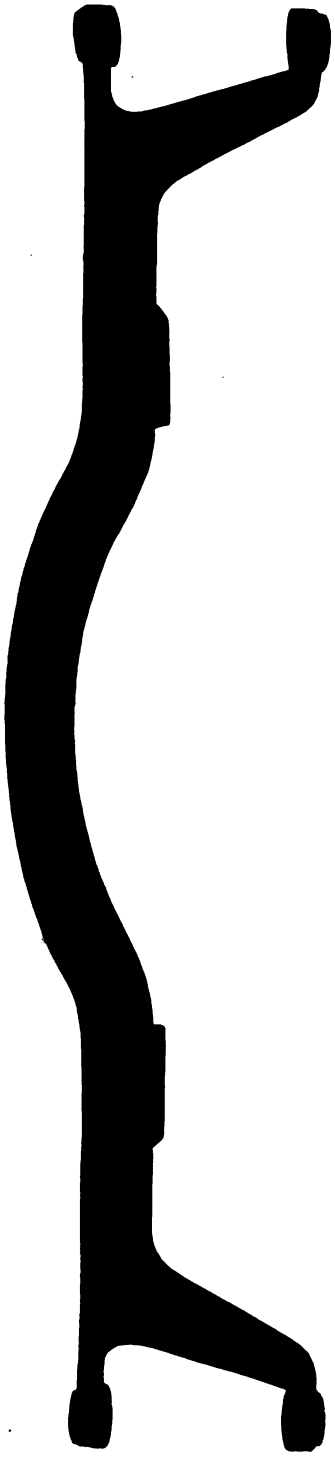
Value?

ANSWER IT FOR YOURSELVES



Your first trucks ought to sell others!

They must if you give value received!

We have to remember that not merely to purchase, not merely to use, but to buy and apply effectively means the success of any business.

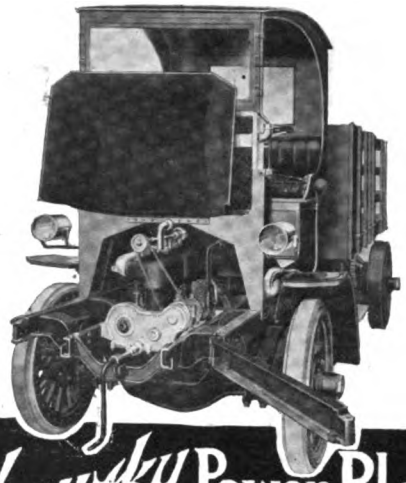
Our bond of interests is mutual.

Considered by the service we render, J. H. Williams & Co. are the cheapest Drop-forgers in the country.

Ask us to prove it!

Bring your blue prints to the Shows —Space No. 175 Madison Square Garden, N. Y.; No. 67 Coliseum, Chicago.

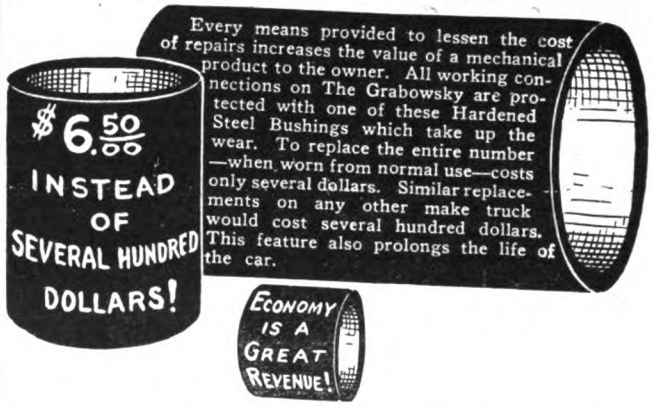
J. H. WILLIAMS & COMPANY
Superior Drop Forgings
69 RICHARDS ST., BROOKLYN, N. Y.



Grabowsky Power Plant Slides Out Like A Drawer That's Accessibility!!

THE entire power plant—the very heart of the machine—at one's finger tips, ready for inspection or adjustment at all times, without holding up the car in service. Thus, efficiency is quadrupled. This feature of perfect accessibility is of vital importance, as inaccessibility results in neglect—neglect means heavy, unnecessary expenditure—early and rapid depreciation, loss of operating efficiency, we claim, and can prove.

Grabowsky Removab e Power Plant is a Money Saver . A Time Saver !


$6.50/00
INSTEAD OF SEVERAL HUNDRED DOLLARS!
Every means provided to lessen the cost of repairs increases the value of a mechanical product to the owner. All working connections on The Grabowsky are protected with one of these Hardened Steel Bushings which take up the wear. To replace the entire number —when worn from normal use—costs only several dollars. Similar replacements on any other make truck would cost several hundred dollars. This feature also prolongs the life of the car.
ECONOMY IS A GREAT REVENUE!

Our lubricating system is another great lesson in economy. By use of our system about a pint of oil is fed the motor every three minutes—reclaimed and refiltered and used over and over again—making it more economical and efficient than that of any other make.

Aside from extraordinary engineering skill—**time and money saving features which no other car has nor can have**—the utmost care is exercised to the minutest detail of construction, material, treatment of same, expert workmanship, so that when you, Mr. Business Man, invest in a Grabowsky, you buy a truck that is commercially correct. You buy service! You buy economy!

Results Talk!

"We are using Grabowsky Trucks with the greatest success, delivering to all parts of the city and surburbs in all kinds of weather, and have never lost a trip. Before purchasing these trucks, we went thoroughly into this matter and wrote letters to truck users in other cities. In every instance a favorable reply was received from Grabowsky users." "Lipman, Wolfe & Co., Portland, Oregon."

"After using our Grabowsky all summer and running it 60 to 70 miles a day, we find the car to be all you claimed for it. It has given the utmost satisfaction. The upkeep has been far below our expectations. You may expect another order from us. "L. Metzger & Co., New York, N. Y."

"I have in use two 1½-ton capacity Grabowsky trucks. Same have been in daily operation (no holidays in my business). They have given good service and are certainly doing more and better work than any other make of truck now operated in this city. In this respect I have been making very close observation. "W. C. Faust Transfer Co., New Orleans, La."

Agency territory available for busines men of standing!

Cars built to meet every commercial requirement. One to five ton capacity. Send for descriptive four cylinder literature.

WE INVITE INVESTIGATION! WRITE US TODAY!

"We Guarantee Service"

Grabowsky Power Wagon Co
1804 Mt. Elliott Ave.
Detroit, Mich.

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HIGH SPEED
NON-GRAN
BEARING BRONZE

"Will not metallize the oil"

It's The Silent Car That Speaks Loudest For NON-GRAN

Engine noise is the index to trouble, to expensive repairs, to speedy dissatisfaction. Noisy operation is usually due to worn bearings.

Minor shaft bearings of NON-GRAN bronze are a big factor in making and *keeping* a car silent.

Only by the use of the bearing bronze that will not flake off, that cannot granulate under wear, is it possible to eliminate that annoying click of the cam shaft; the rattling of the valve plungers; the metallic knock due to worn wristpin bearings, and the many other noises that are directly traceable to minor shaft bearings that will not stand the wear.

Poorly alloyed, granular bronze for minor shaft bearings leads to noise and trouble, not only at such minor shaft points, but throughout the motor. If any such bronze is used, it is but a short time before the oil—which becomes laden with metallic particles as it passes through these granular bearings — will grind, heat and create trouble wherever it goes. Cylinder walls are cut, with the resulting leakage of gas and loss of power, and white metal main shaft bearings fail to retain their snugness or keep the shaft in alignment.

Is it nothing to you to avoid these noises, and the consequent deterioration of your car? Even the slightest knock should be a warning to you to replace all your granular minor shaft bearings with NON-GRAN bronze.

NON-GRAN is put up in cored bars for quick, convenient and economical replacement of minor shaft bearings; 1,100 of the foremost Garages are already using it exclusively for this purpose. Because of their great convenience, any repairman will appreciate your bringing these bars to his attention.

Our new booklet W., just off the press, gives full information upon the menace of having *any* granular bronze bearings in your car. It is an authority on the subject, full of vital facts. It shows why and how granular minor shaft bearings increase your repair bills and decrease the life and efficiency of your car. The whole question of minor shaft bearings is covered in a simple, non-technical manner, the structure of the different classes of bearing alloys, is shown by the photographic illustrations, which tell the story. Before you buy a new car, before you put your present car in the repair shop for overhauling, send for this booklet W. It has dollars and cents value for you.

As you find NON-GRAN in the repair shop

American Bronze Company, Berwyn, Pa.

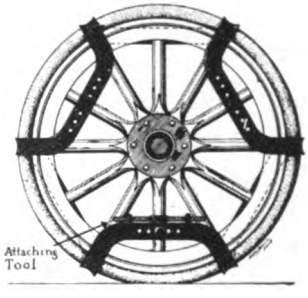
Lyon Grips in Service.

Your Trucks Can Make Their Schedule

if equipped with Lyon Grips. Snow, ice and mud don't bother them, and expense is reduced while earnings are increased.

LYON GRIPS

are a scientific solution of the peculiar problems connected with solid tires. They are not a loose-link device; and, unlike such devices when applied to solid tires, they are astonishingly durable. They last two seasons or longer in ordinary service. Lyon Grips cannot cut the tires; they are easily applied and detached, and their cost is very moderate when their mileage is considered. Our booklet tells the story fully.



If you want Lyon Grips for this season's use, do not delay ordering. We are obliged to refuse a large percentage of orders at this time of year, and to make time delivery on others. State make, size and *style* (wireless, side wire etc.) of tires when ordering, also whether single or dual.

LYON NON-SKID CO.

431 N. Broad Street, PHILADELPHIA, PA.

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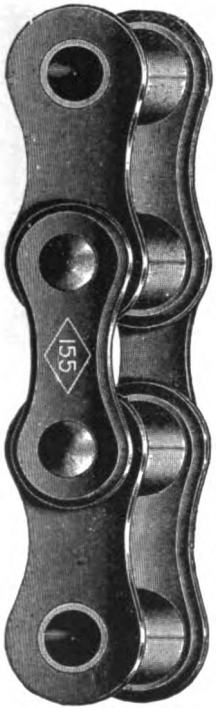
Some Facts About Chain Drives on Moter Trucks



Chain drive is more highly regarded than ever by motor truck designers abroad as well as at home. In France, chain driving is very largely used by those firms who have been most successful in the War Department trials. In Germany, all vehicles built under the Government Transport Scheme must be chain driven by 1912, and in Great Britain, too, chain drive is advancing. 246 of the 399 cars in the London 1911 Annual Parade of the Commercial Motor Users Association were chain driven and 59 percent of the first prizes went to chain driven cars. It is an established fact that more English commercial cars are built with chain drives than with all other forms of transmission combined.

Double Diamond Chain drives, with their simple strong back axle are less subject to damage from bad road impacts and are more durable and reliable than any other drive that can be put onto a heavy duty commercial car.

The experimenting has been done by us and you have the evidence of satisfaction to the user from years of service. We will gladly cite numerous motor truck makers who have used Diamond Chains throughout their manufacturing life, and whose customers will tell you that you are on the safe side with Diamond Chains.

Our engineers will advise, without charge, on designing problems.

TRADE ◇ MARK

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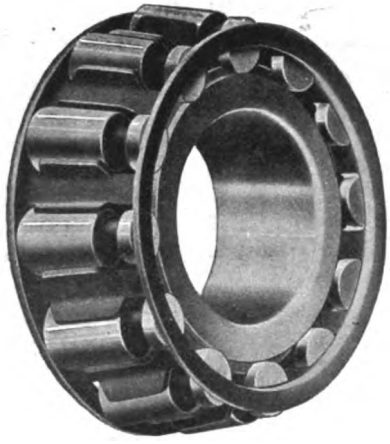

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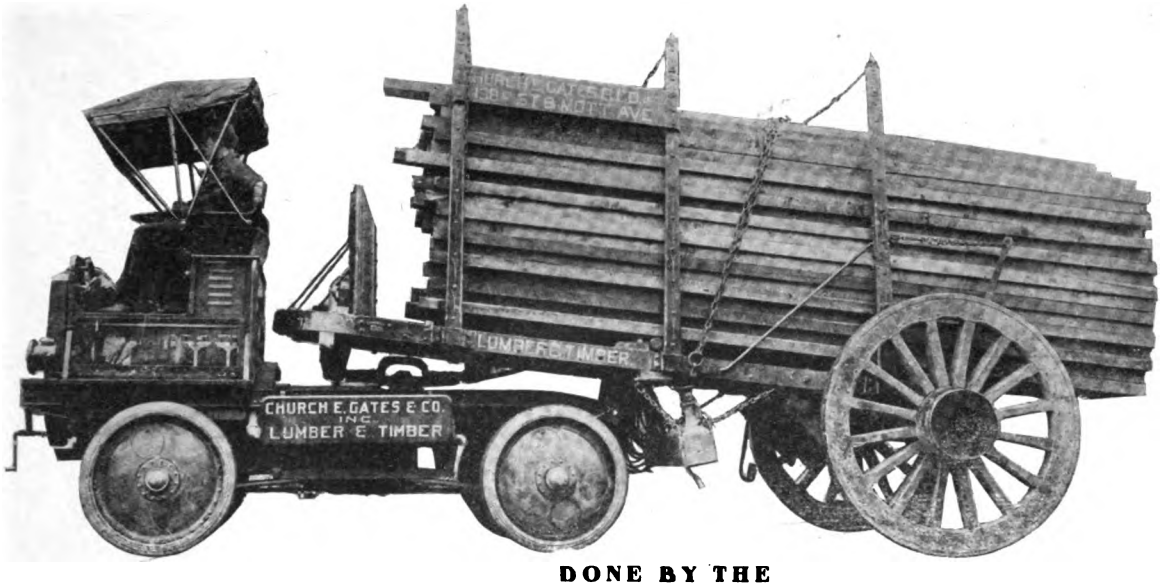

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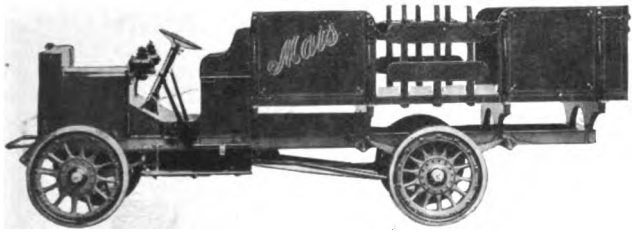

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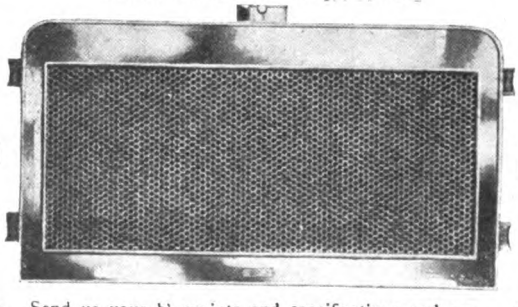

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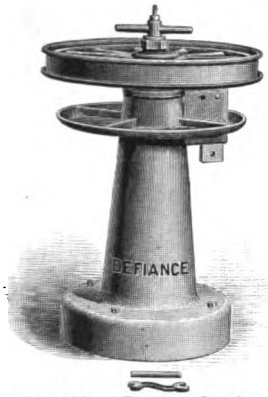

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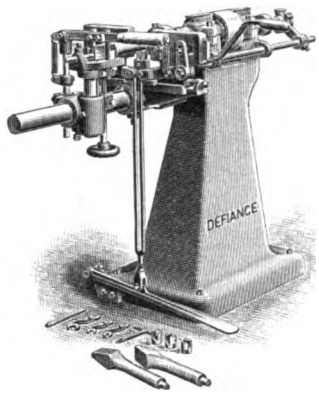

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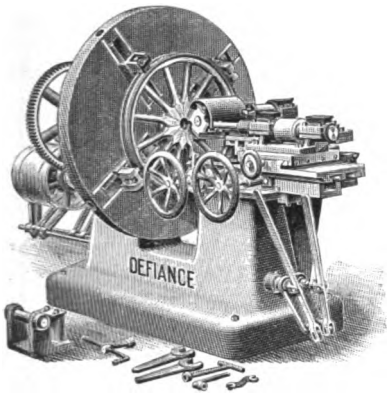

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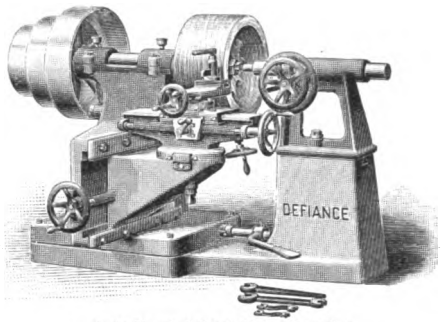

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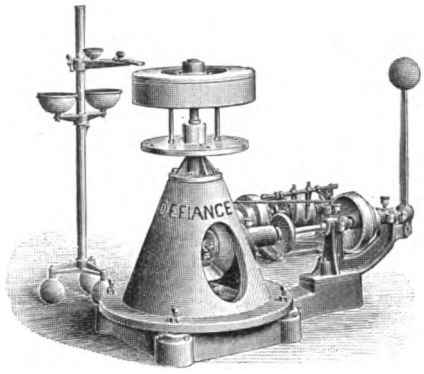

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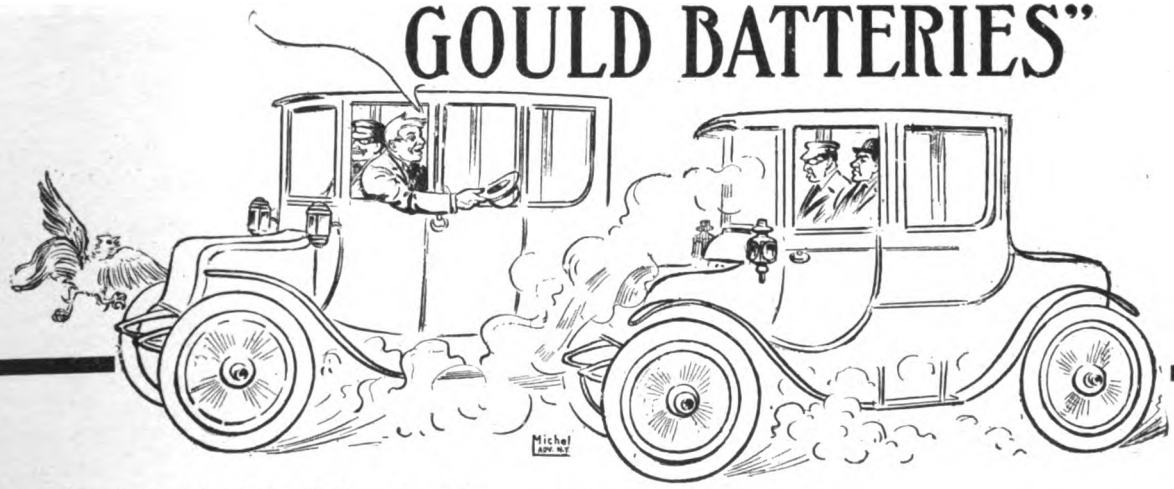

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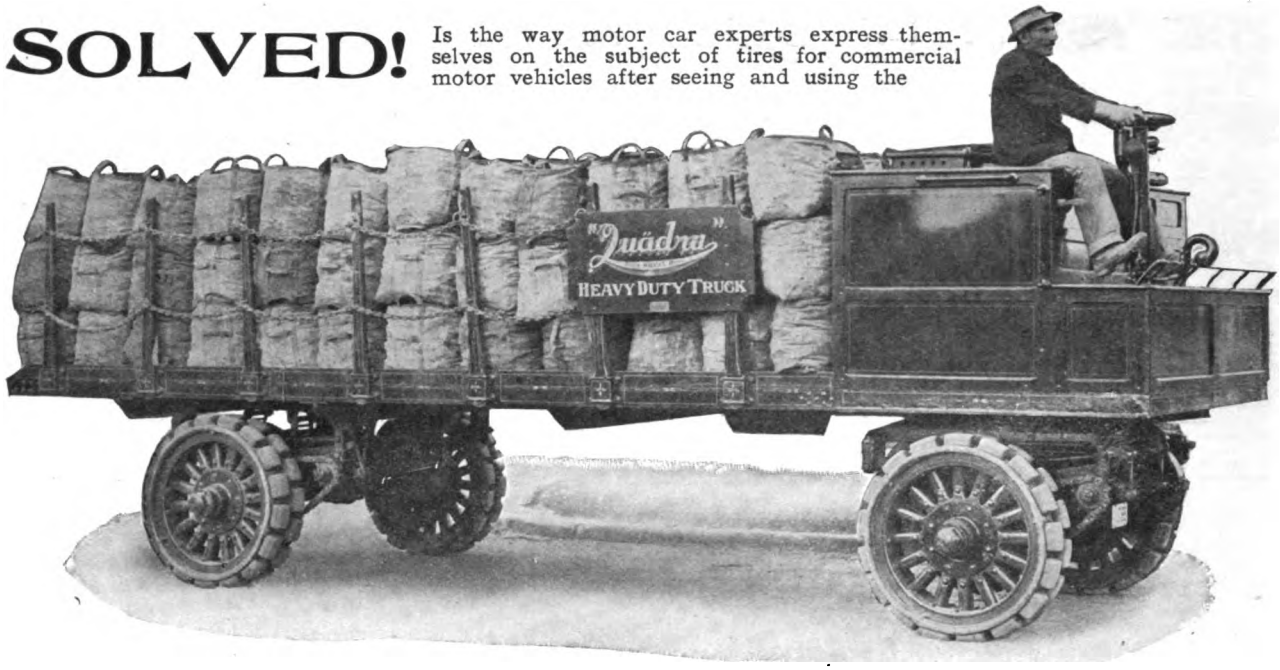

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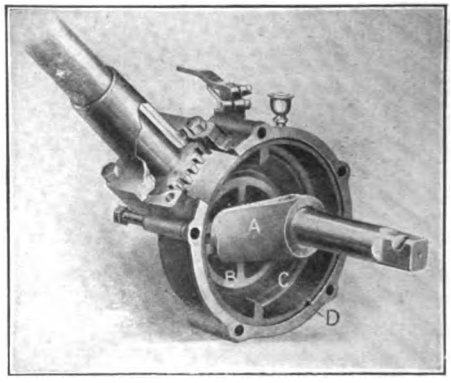

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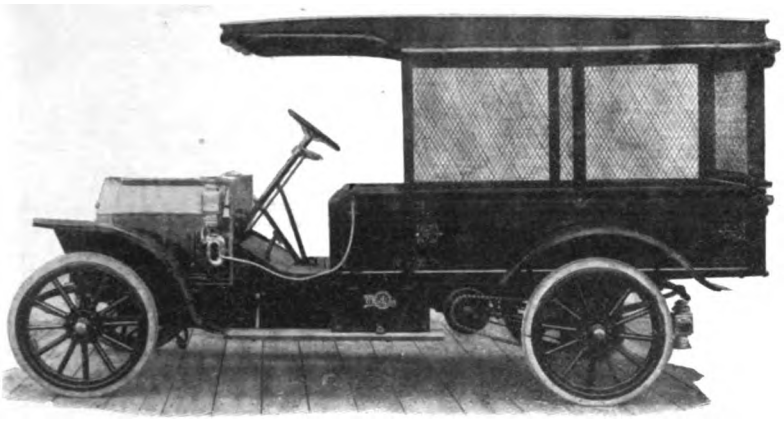

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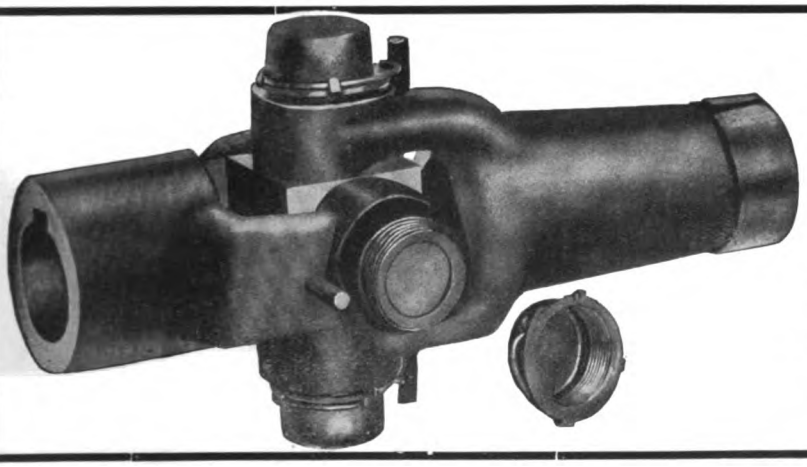

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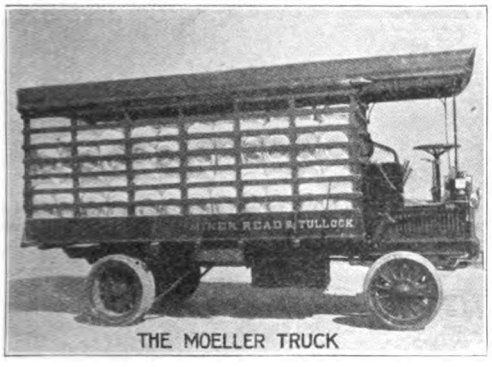

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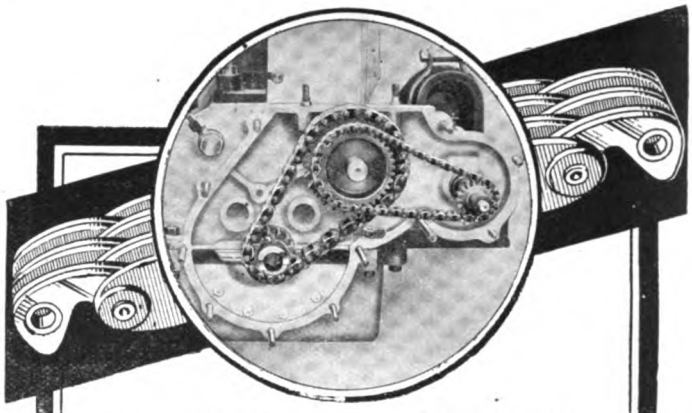

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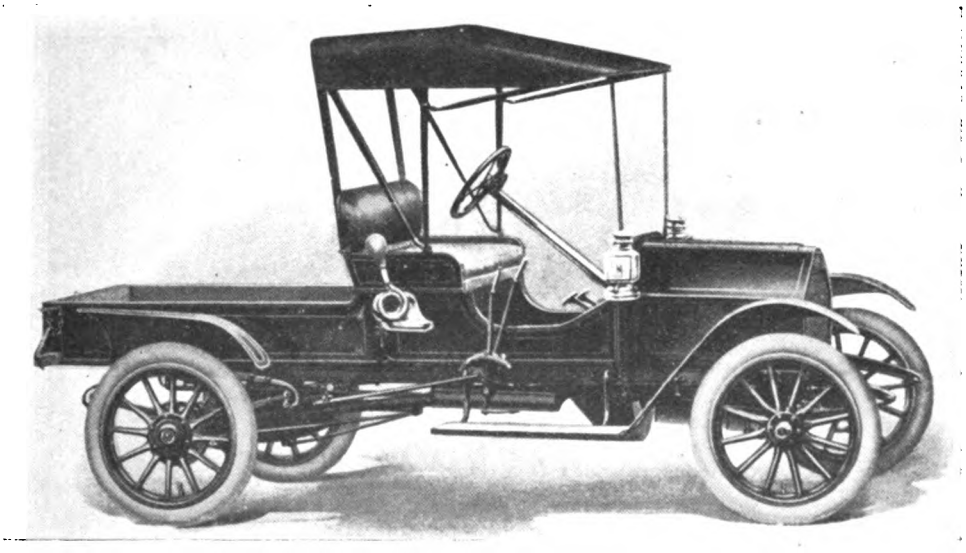

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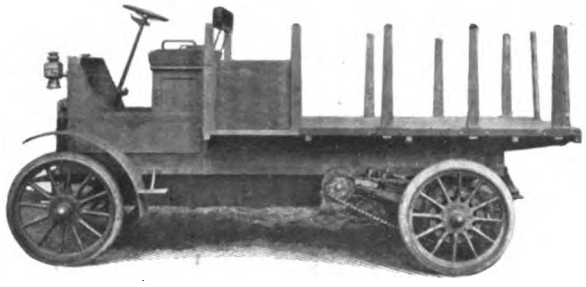

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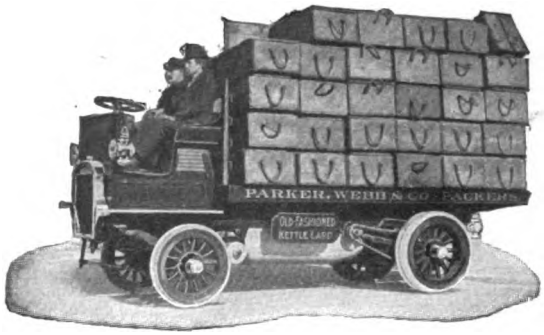

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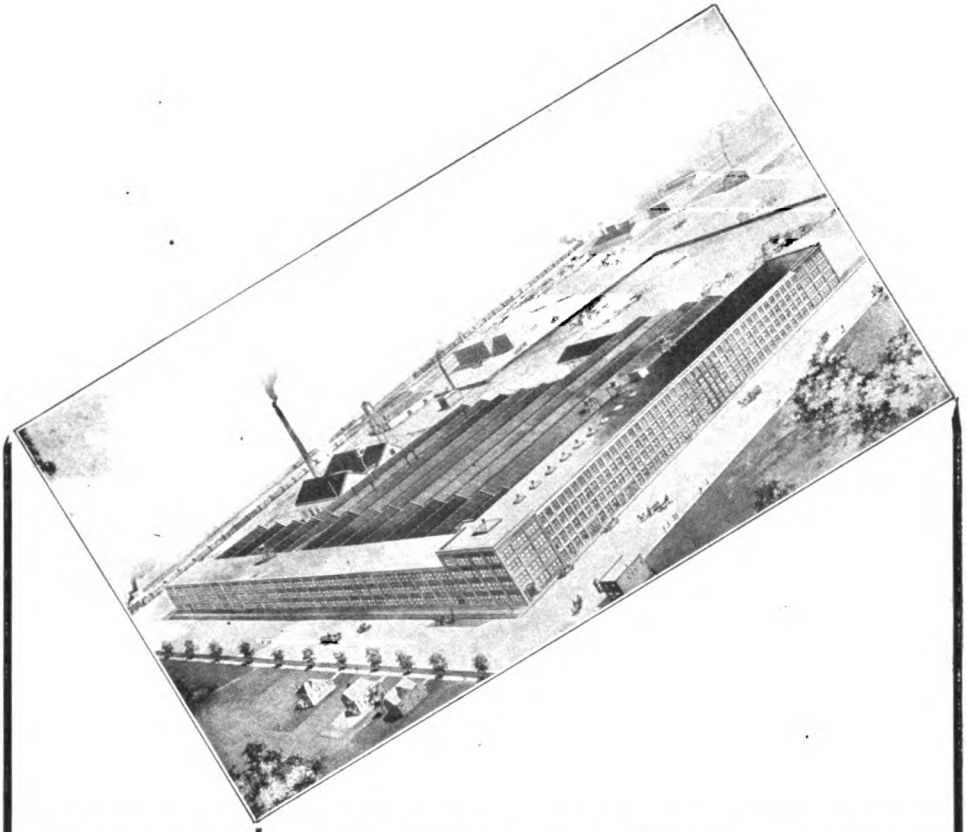

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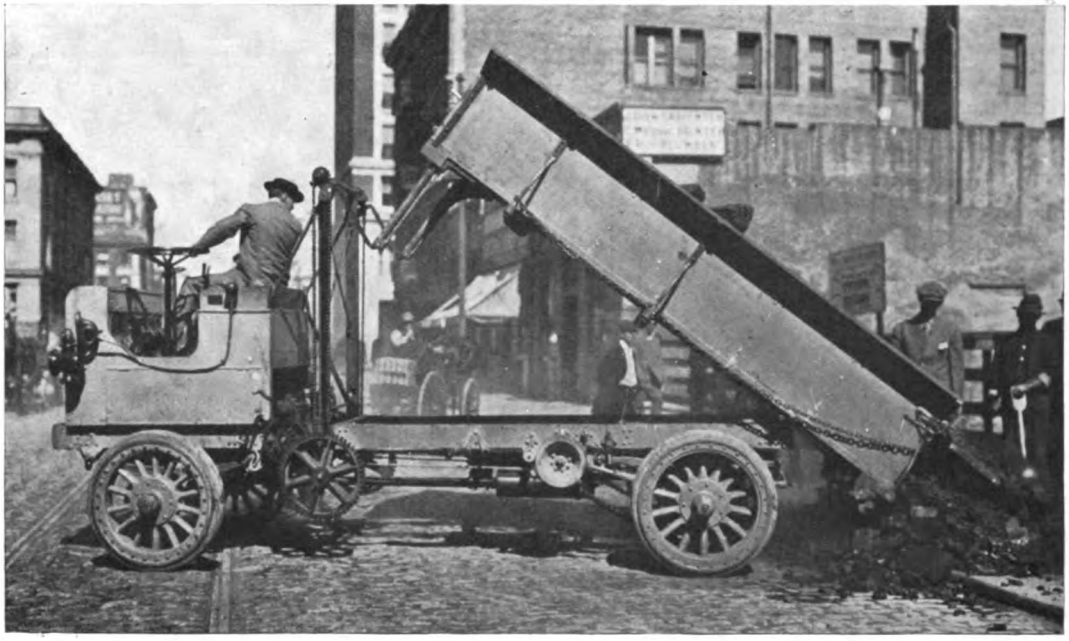

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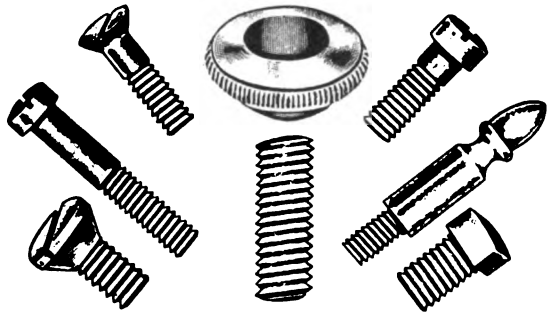

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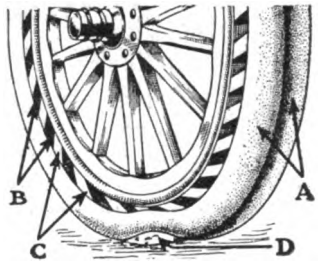

A—Shows *double*, notched treads.
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C—Shows slantwise bridges.
D—Shows absorbing means when passing over an obstruction.

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It is no longer necessary to subject your light delivery car to the jolting, racking strains of road conditions. For Motz Cushion Tires, a wonderful invention, will protect it from such shocks and just about double its life.

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This remarkable resiliency is accomplished by ingenious *double treads, undercut sides* and *slantwise bridges* which are our own exclusive patents.

MOTZ Solid Tires

Heavy duty trucks, where load and not speed is a factor, should be equipped with Motz Solid Tires. They also fit standard clincher, universal detachable or demountable rims.

Let us tell you more about these money-saving tires and what owners of commercial cars who use Motz Cushion Tires and Motz Solid Tires say about them. In writing please ask for Booklet 92.

THE MOTZ TIRE AND RUBBER CO. Factories and Executive Offices **Akron, Ohio**

BRANCHES—New York, 1737 Broadway; Chicago, 2023 Michigan Avenue; Detroit, 999 Woodward Avenue; Kansas City, 409 East 15th Street

158

Lavigne Steering Gears

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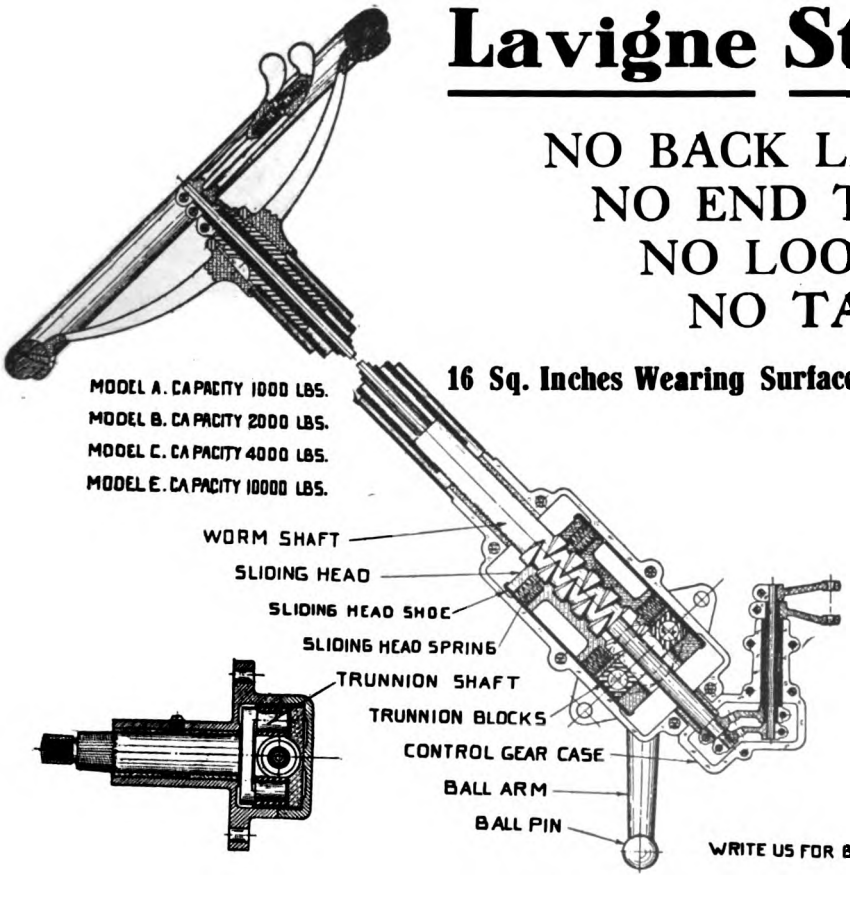
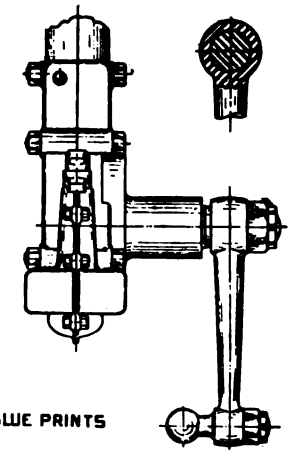
NO END THRUST
NO LOOSE PARTS
NO TAKE UP COLLARS

16 Sq. Inches Wearing Surface — All Adjustment Positively Automatic





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Detroit, Mich.

Factories:
Detroit, Mich.
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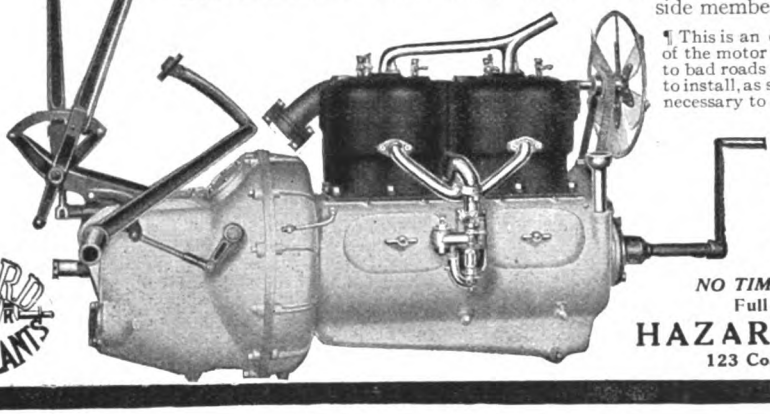
One of Many Features of HAZARD Unit Power Plants

Three Point Suspension

¶ The three points of suspension of the Hazard Unit Power Plant are in the form of trunnions; one trunnion at the front, resting on the front cross member of the truck, and two trunnions at the rear, resting on bearings secured to side members.



¶ This is an especial feature, as it eliminates all chances of the motor being twisted or strained out of shape due to bad roads or rough usage. It also makes it much easier to install, as sub-frame is entirely eliminated, and it is not necessary to do any lining up of motor and transmission.

¶ OTHER FEATURES: Motor, Clutch, Transmission and Gear Shift Control in one Compact Unit. No alignment of parts necessary. Can be mounted in practically any frame.

¶ A Throttle Governor enables owner to regulate speed. Cannot be tampered with by driver.

HAZARD MOTOR POWER PLANTS

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HAZARD MOTOR MFG. CO.

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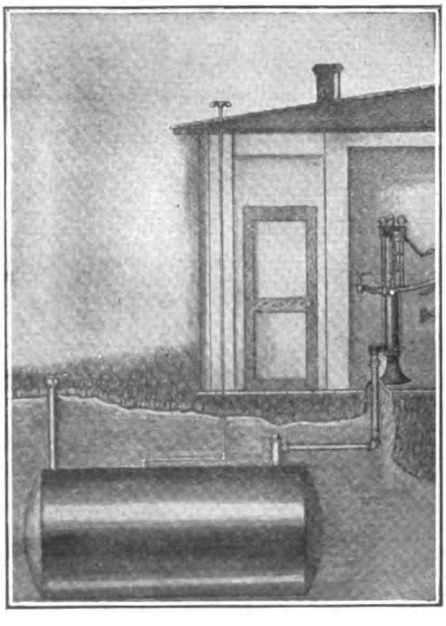

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Air Tight Tanks are constructed of 3-16 inch, or heavier, Open Hearth Steel with all seams and joints BRAZED. Every AIR TIGHT seam and joint is guaranteed to be as strong as the steel the tank is constructed of. A 100% tank.

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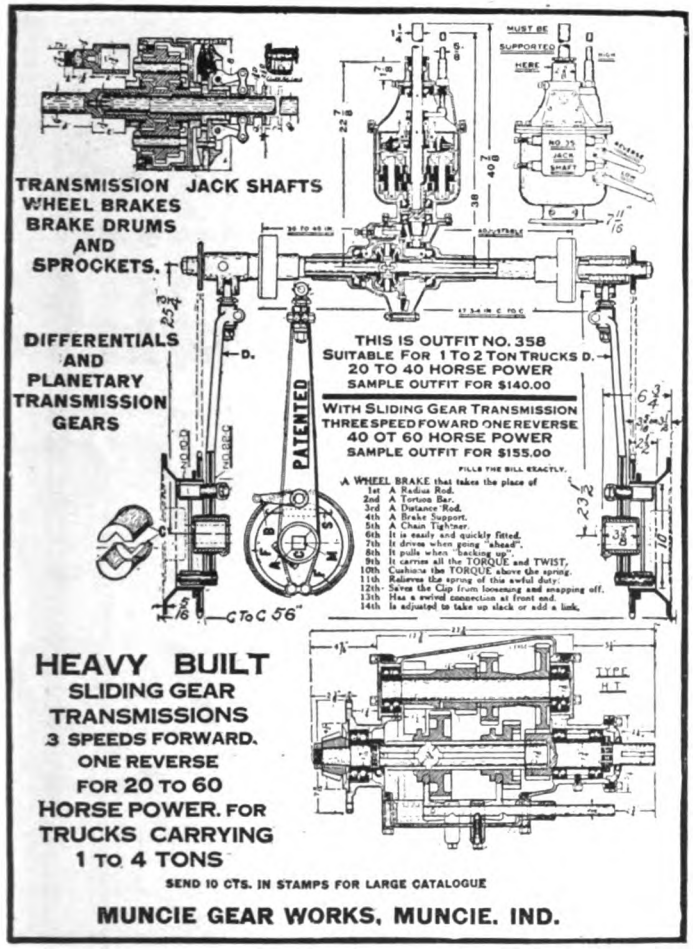

Culver-Taylor Detachable Chain

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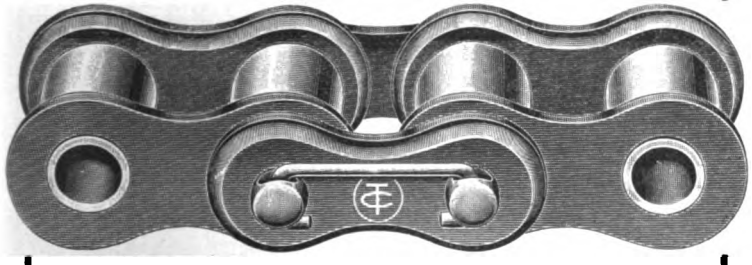

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The Edison Storage Battery

For Electric Commercial Vehicles

With the *same* battery weight, practically double the mileage capacity on a single charge—

Or, the same mileage capacity with *half* the battery weight and much greater proportionate *load* capacity.

This is just one of the many definite and important advantages of the Edison over all other storage batteries. If you are a motor vehicle user or a prospective user, you should know *all* the advantages of the Edison Storage Battery before you increase or install your motor vehicle service. If you are an electric vehicle manufacturer you should equip one wagon with the Edison and operate it in direct comparison to the rest of your product.

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Under Auspices of National Association of Automobile Manufacturers, Inc.

NEW YORK

Grand Central Palace—January 10-17

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Dow, Joseph
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Kissel Motor Car Co.
Knox Automobile Co.
Lauth-Juergens Motor Car Co.
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National Motor Truck Co.
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Lubricating The Motor Truck

The hands on your watch would be almost useless if used on a clock face, and for the same reason ordinary lubricants cannot successfully carry the heavy motor truck up hill and down and over all sorts of roads.

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are ideally adapted to meet the difficult lubricating requirements of the motor truck, for flake graphite, their basic ingredient, has time and again proved its efficiency where other lubricants have utterly failed. May we send you free sample 229-G?

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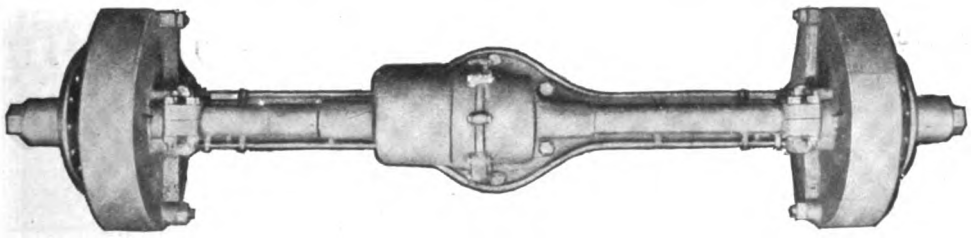

CHICAGO
Commercial Section
Gallery 12

Torbensen Internal Gear Truck Axle

Torbensen Gear & Axle Company
Bloomfield, N. J.

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'HELE-SHAW CLUTCH—EVANS' MODEL

USED ON 48 MAKES OF CARS

Austin	Cino	Eagle	Lewis	Packers	Reliance
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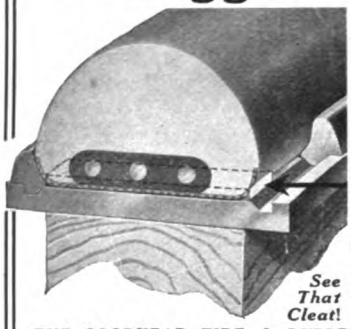

See That Cleat!

Equip only with trouble-proof Goodyears—the **Endless Motor Truck Tires** with Hard Rubber Base.

These tires combine extreme resiliency with utmost **durability**. You can put them on, then forget them. The hard rubber base, vulcanized to soft rubber tread, affords a solid bed for the steel fastening. Cleats lying crosswise in the tire seat fit slots in base of tire—abolish possibility of tire slipping or creeping—do away with **all resultant tire evils.**

Thousands of sets used in every part of the United States. They add to truck earning power because they subtract from operative costs.

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Endless Motor Truck Tires
With Hard Rubber Base

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The greatest and most rapid cooling ability with the least pounds of weight.

An average of one-half the wind resistance of any radiator made.

The maximum of strength with the minimum of weight.

The only radiators in the world which may be frozen with no danger of splitting the tubes.

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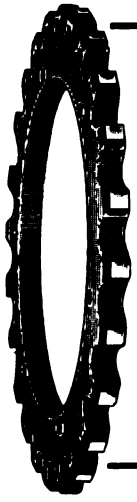

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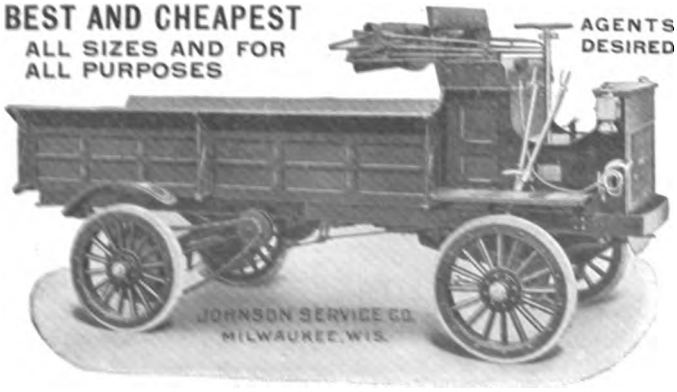

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KANT-BREAK

BEST FOR COMMERCIAL CARS

1000-LB. TO 10-TON TRUCK

All our Universals are made from Drop Forgings and are case-hardened throughout.
Unequalled for workmanship and finish.

Deliveries within two weeks from receipt of specifications.

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American Distributing Co., Jackson, Mich., Western Sales Agents.

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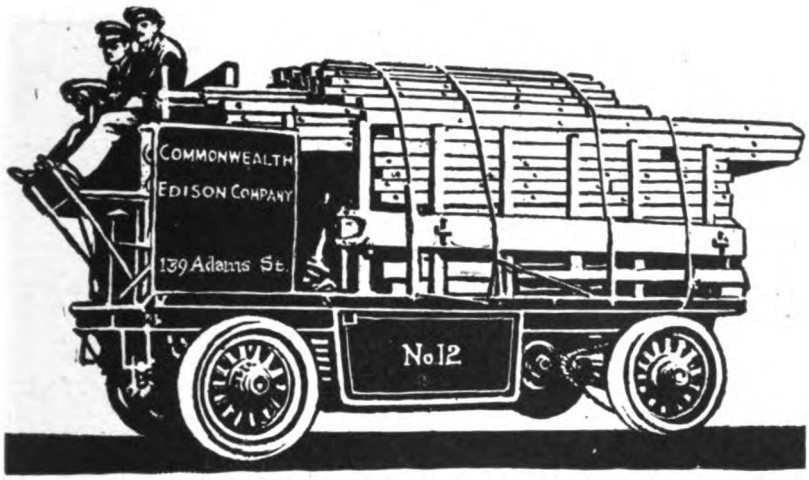
"The Horse Must Go"

Says Thomas A. Edison

Mr. Edison says: "*There is absolutely no reason why horses should be allowed within city limits. The cow and pig have gone and the horse is still more undesirable.*" Rapid progress is being made in this direction. Horse-drawn vehicles are being rapidly supplanted by the more economical and reliable power wagon, and electricity is playing an important part in this transition.



The prevailing low price for Central Station power and the many improvements which have been made recently in both storage batteries and motor equipment have combined to make the electric vehicle an absolutely dependable piece of apparatus. In fact, when used in the class of service for which it is adapted, it is the most economical and satisfactory method of transporting either passengers or merchandise.

Electric Trucks are Best

Not only is the Electric Truck speedier than the horse-vehicle, but it is also tireless—it will work continuously for long periods. Then, too, there is

Its Economy It will save from 10% to 25% over the cost of horse haulage, besides securing many other advantages, such as greater speed, ability to operate in all conditions of weather, less space and no operating expense when not in use, etc.

Its Simplicity The electric vehicle does not require an experienced chauffeur—any horse driver can be taught to run it successfully. Moving parts are few in number, rugged in construction and easily kept in order. The electric vehicle can be started, operated and guided with ease.

Its Safety With it there is no risk of runaways, fire or explosion; no increase of fire insurance, no noise and no smoke to damage goods in transit.

The Commonwealth Edison Company Maintains a Special Automobile Department and Employs Experts who are at Your Service to Advise with You on any Matters Pertaining to Electric Vehicles—Either Pleasure Vehicles or Commercial Trucks.

Commonwealth Edison Company

Edison Building **120 West Adams Street, CHICAGO**

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Ask the man who owns one

Packard

PACKARD TRUCKS ARE USED IN ONE HUNDRED AND FIFTY-FOUR DIFFERENT LINES OF TRADE AND IN TWO HUNDRED AND THIRTEEN CITIES

Several Big Batteries of Packard Trucks

Acme Tea Company, Philadelphia, *10 trucks*
Adams Express Company, New York, *19 trucks*
American Express Company, New York, *15 trucks*
Armour & Company, Chicago, *5 trucks*
Anheuser-Busch Brewing Association, St. Louis, *18 trucks*
Barrett Manufacturing Company, Philadelphia, *6 trucks*
Crystal Park Company, Manitou, Colo., *7 trucks*
A. C. Dietsche, Detroit, *4 trucks*
Kaufmann Brothers, Pittsburgh, *12 trucks*
Gottfried Krueger Brewing Company, Newark, N. J., *7 trucks*
Wm. J. Lemp Brewing Company, St. Louis, *8 trucks*
Frederick Loeser and Company, Brooklyn, *7 trucks*
Mandel Brothers, Chicago, *8 trucks*
Marshall Field and Company, Chicago, *17 trucks*
Standard Oil Company, New York, *7 trucks*
Standard Varnish Works, New York, *4 trucks*
Swift and Company, Chicago, *17 trucks*
Union Railway Company, New York, *4 trucks*
Victor Talking Machine Company, Camden, N. J., *4 trucks*
John Wanamaker, New York, *13 trucks*
Welz and Zerwick, Brooklyn, *6 trucks*

Send for the book, "The Trail of the Lonesome Truck." It tells about the unprecedented journey of a 3-ton Packard, the first heavy-duty motor vehicle to cross the continent on its own power

PACKARD MOTOR CAR COMPANY, DETROIT

Ask the man who owns one

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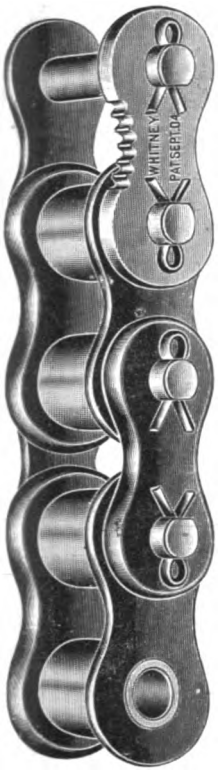
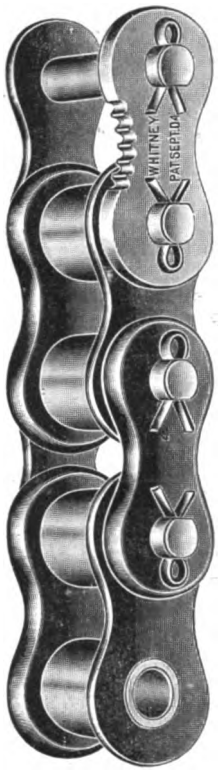
"Whitney Chains Are Built for Strains"



At the Auto Shows

notice the great number of cars
equipped with "Whitney" Chains

Look For The Cotter Pins



The Whitney Mfg. Company
Hartford, Conn.

Detroit Oilers give real economy

The Detroit Force Feed Oiler supplies exactly the right amount of oil at all times.

Every drop of oil is **measured** and forced to the place where it is **needed** and eventually consumed. The engine speed fixes the rate of feed.

Always enough oil, yet never a bit is wasted. **Every drop is put where it counts.**

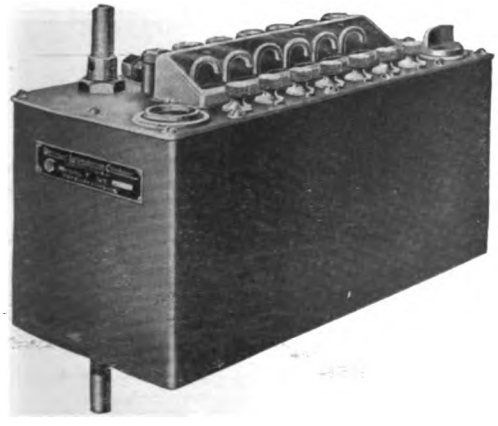
The Detroit Force Feed Oiler absolutely prevents waste and eliminates the smoke nuisance which is the sign of waste.

The Detroit Oiler supplies new, clean oil, **free** from carbon, dirt and abrasive particles of metal which grind and wear the bearings and moving parts.

It prevents the costly replacements, adjustments and withdrawals from service necessitated by faulty lubrication.

The Detroit Oiler pays a double profit in the decreased cost of maintenance and in the added life and uninterrupted service it gives the engine.

A Detroit Force Feed Oiler is a guaranty of satisfactory lubrication.



A Detroit Force Feed Oiler insures proper lubrication

There is no chance for careless and unskilled drivers to waste oil through the exhaust or starve bearings and damage the motor. The Detroit Oiler is absolutely automatic.

There is a Detroit Oiler for **every** kind of truck. They are made in capacities from two pints to five gallons, with from one to thirty feeds. Pulley, ratchet or gear drive.

The Detroit catalog tells all about them—their many advantages in design and construction which have made the Detroit the standard gas engine lubricator.

Detroit Force Feed Oilers are furnished as standard equipment by many manufacturers of high grade commercial trucks. Others can furnish them when specified.

Write today for catalog P-68 and full information stating in what make of truck you are interested.

DETROIT LUBRICATOR COMPANY.
DETROIT, U. S. A.

Largest manufacturers of lubricating devices in the world.

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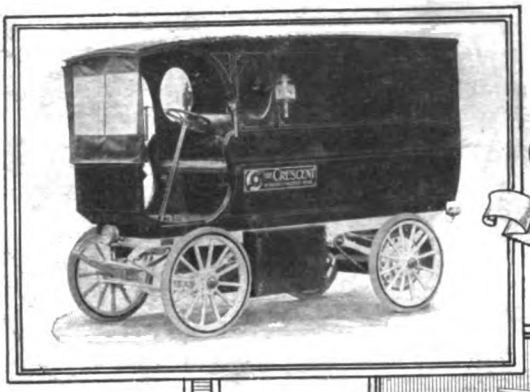
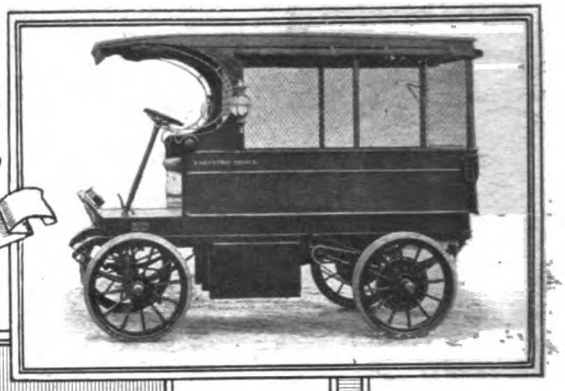
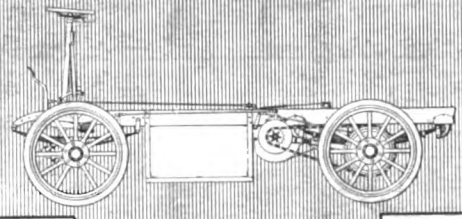
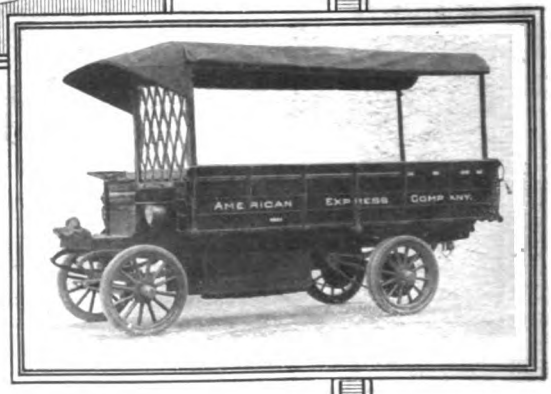


Baker Electrics

COMMERCIAL CARS







Says a large manufacturer: "Our experience with electric delivery service has convinced us of its economy. We now have ten electric machines in daily service. These have displaced twenty-seven horses and the cost of operation is one-half."

Almost every electric truck will perform more and better service than horse drays. Baker electrics are most efficient—are being installed by the large express companies, the U. S. Government, and leading stores.

Three sizes built; delivery wagon, light truck, heavy truck. Bodies to suit purchaser's need.

THE BAKER MOTOR-VEHICLE COMPANY

Commercial Car Department

69 WEST 80th STREET, CLEVELAND, OHIO

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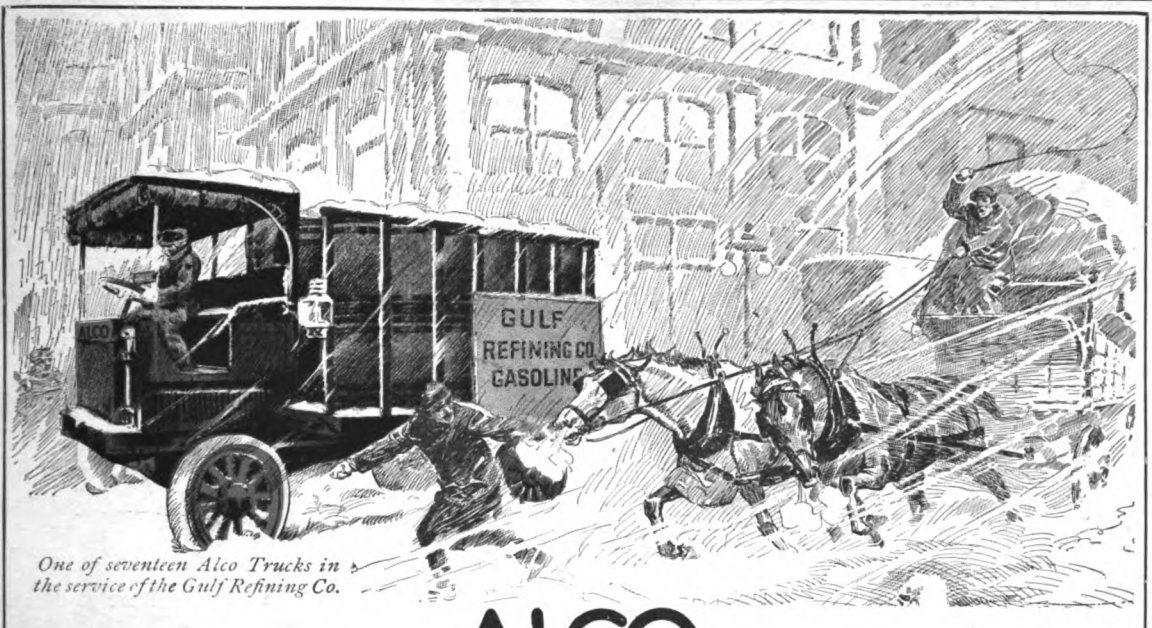
No. 87. Chicago, February, 1912. Price 20 Cents.

THE POWER WAGON



One of seventeen Alco Trucks in the service of the Gulf Refining Co.

ALCO
Motor Trucks

The Factor of Safety is Five

EVERY Alco truck is built to withstand a shock *five times* greater than the normal strain. The factor of safety built into the Alco truck is five. This is a high factor, as all engineers know. In a huge bridge the factor of safety is only two.

A large factor of safety, such as five, in the Alco truck, does not mean a super-heavy monster. The Alco truck is no heavier than the average truck of its rating.

The reason for this is clear; by using materials of high physical properties with great ductility—materials minus seams, flaws, checks, pipes and cracks—the weight is reduced to a minimum.

A large factor of safety also means long life. **No one can tell how many years an Alco frame will last—perhaps longer than a man's lifetime. A front or a rear axle may last twenty, thirty or forty years.**

A large factor of safety is one of the things that *seventy-six years of transportation experience* produces in motor truck building.

AMERICAN LOCOMOTIVE COMPANY, 1894 Broadway, NEW YORK

Builders also of Alco 6-cylinder and 4-cylinder Motor Cars and Alco Taxicabs

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Boston Branch: 567 Boylston Street

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Movers of the World's Goods since 1835

Capital, $50,000,000

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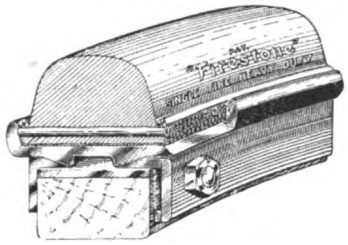
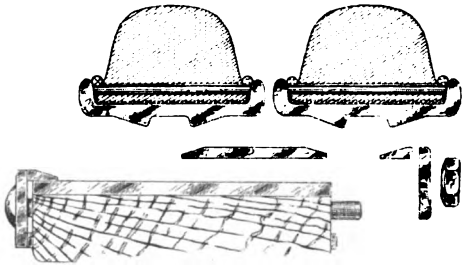
LEADS AGAIN IN TRUCK TIRES

Has More Equipment than Any Others at the New York Shows, by a Wide Margin

A COMPLETE line of truck tires for every type of car, size of load and condition of service on Removable and Non-Removable rims. Firestone Truck Tires have led the industry from the very beginning in Accuracy of Design, Volume of Output and Quality of Tire. Undisputed leadership has particularly qualified the Firestone Company to offer the only complete and *fully proven* line.

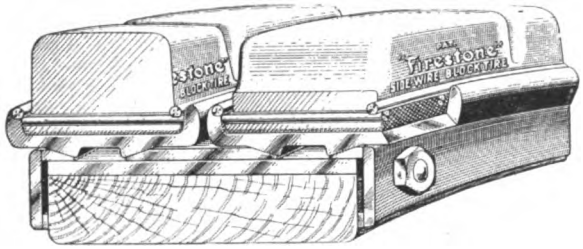


Single Heavy Duty Tire.



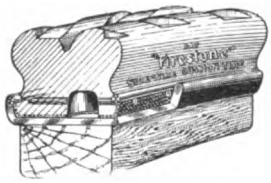
Dual Heavy Duty Tire.

Single and dual Heavy Duty tire for resiliency. Economical in car up-keep. Old and S. A. E. standards. NOTE—Both dual tires can be taken off without removing the wheel.

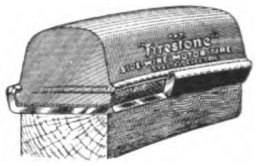


Dual Block Tire.

Block tire for traction and non-skidding in heavy service. Economical in car up-keep. Old and S. A. E. standards.

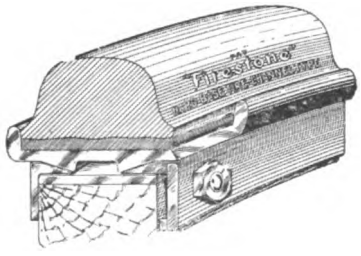


Cushion Electric Tire



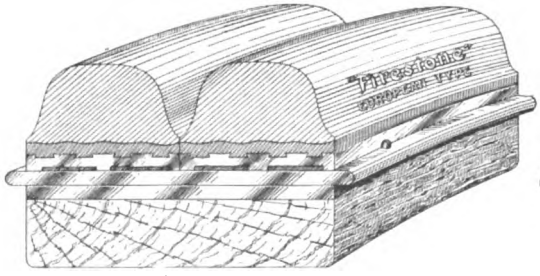
Special Electric Tire.

Cushion and Special Electric Tires for electric pleasure cars and light deliveries. Extremely resilient and economical in current consumption. Rims for Cushion Electric are interchangeable with pneumatic rims. Special Electric in Old and S. A. E. standards.

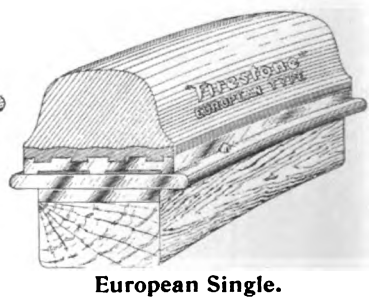


Hard Base Channel Type.

Hard base channel type for heavy service. Old and S. A. E. standards.



European Dual.



European Single.

European type; has a metal-and-hard-rubber base. S. A. E. standards only.

WRITE FOR OUR GUARANTEE.

The Firestone Tire & Rubber Co., Akron, Ohio

"America's Largest Exclusive Tire and Rim Makers"

MORE THAN ONE HUNDRED SERVICE STATIONS FOR TRUCK TIRES.

Please mention the "Power Wagon" when writing to advertisers.

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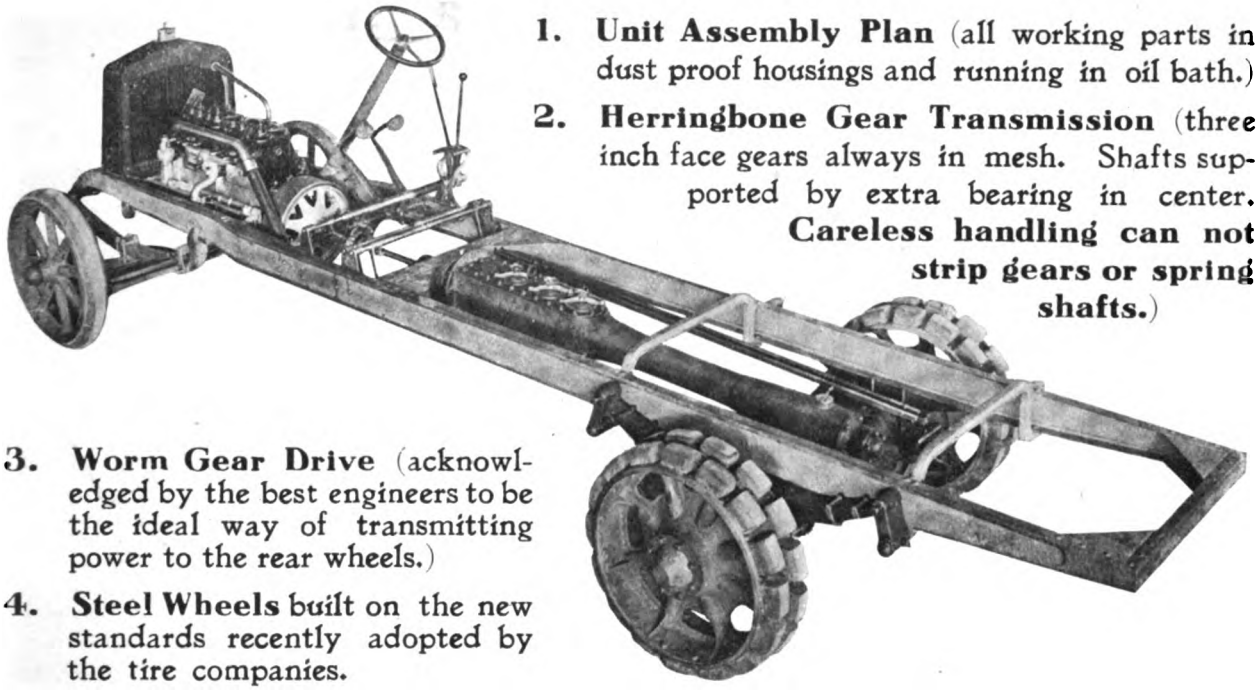
THE A. O. SMITH COMPANY announce that they are prepared to market heavy duty trucks built entirely in their plant at Milwaukee, Wis.

Three Ton Chasses now Ready for Delivery

SPECIAL FEATURES:



1. **Unit Assembly Plan** (all working parts in dust proof housings and running in oil bath.)
2. **Herringbone Gear Transmission** (three inch face gears always in mesh. Shafts supported by extra bearing in center. **Careless handling can not strip gears or spring shafts.**)
3. **Worm Gear Drive** (acknowledged by the best engineers to be the ideal way of transmitting power to the rear wheels.)
4. **Steel Wheels** built on the new standards recently adopted by the tire companies.

A limited number of agencies will be placed for 1912 with dealers who are in position to cooperate with us in giving high grade service to customers. We can offer substantial representatives an opportunity to build up a profitable business.

Do not fail to see our exhibit at Chicago Commercial Show, February 5th 10th, Space B-6 First Regiment Armory.

A. O. Smith Co., Milwaukee, Wis.

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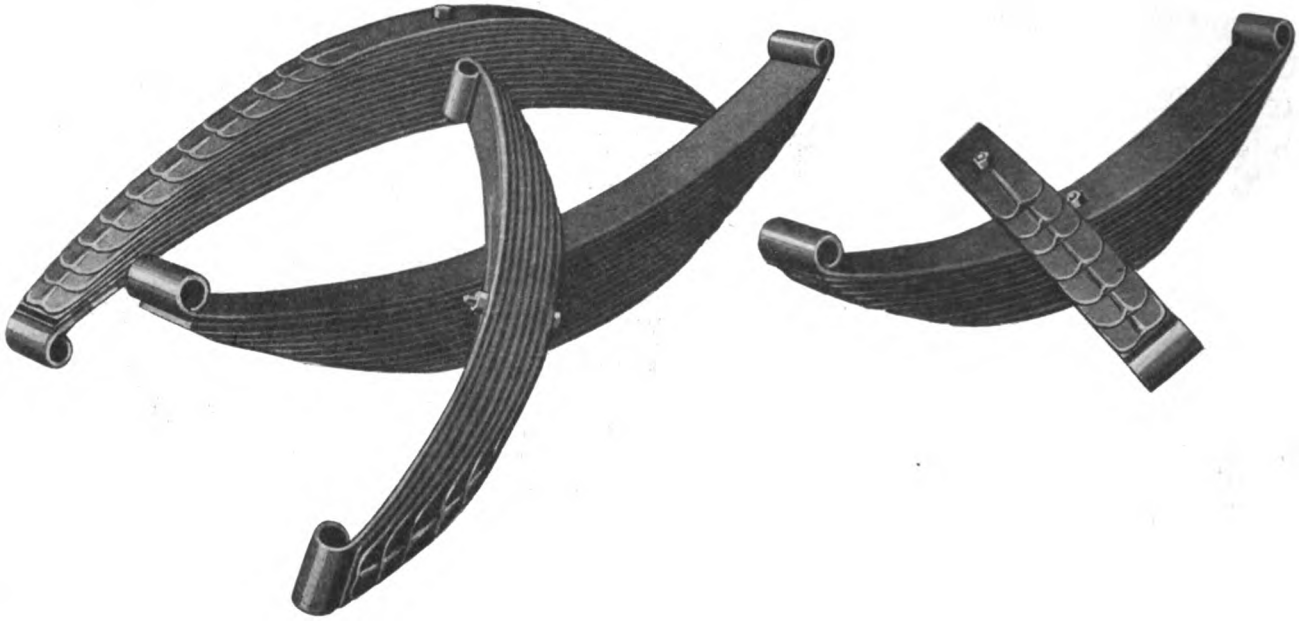
Reliable Springs

Are More Important on Motor Trucks Than on Pleasure Cars



¶ The use of our springs is an insurance policy against interruptions in service. Our thin leaf construction insures absence of destructive vibration WHEN THE TRUCK IS LIGHT and against breakage when the truck is OVERLOADED.

¶ A list of leading manufacturers using our springs furnished on request.

The PERFECTION SPRING COMPANY

Cleveland, Ohio

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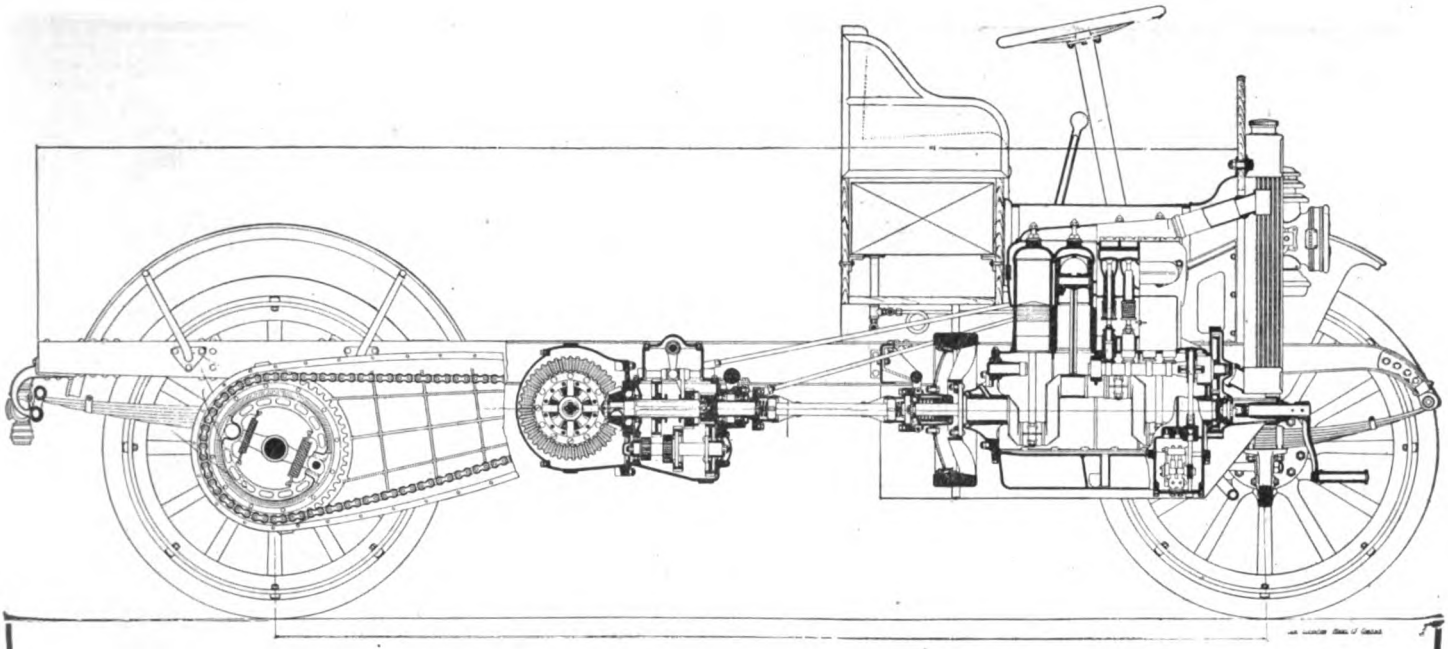


Natco MOTOR TRUCKS

Facilities Unsurpassed
for the
Manufacture of
Motor Trucks

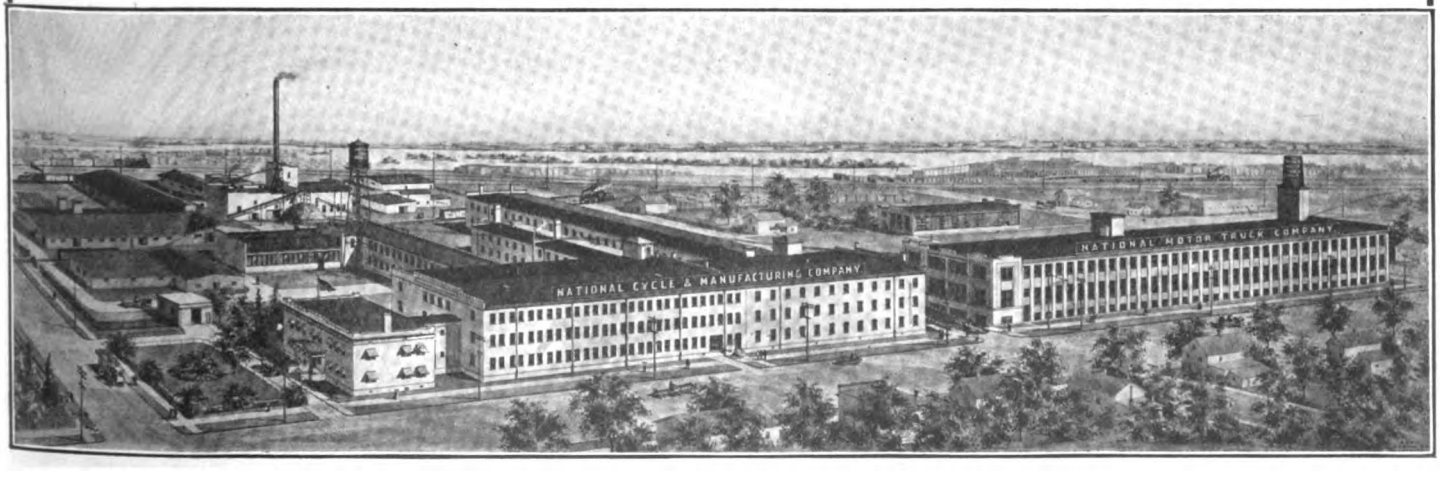
See Exhibit
Space D, Armory
Chicago, February 5-10

National Motor Truck Co.

Under same management as National Cycle & Mfg. Co.

Bay City, Michigan

THE FACTORIES BEHIND THE "NATCO" TRUCK



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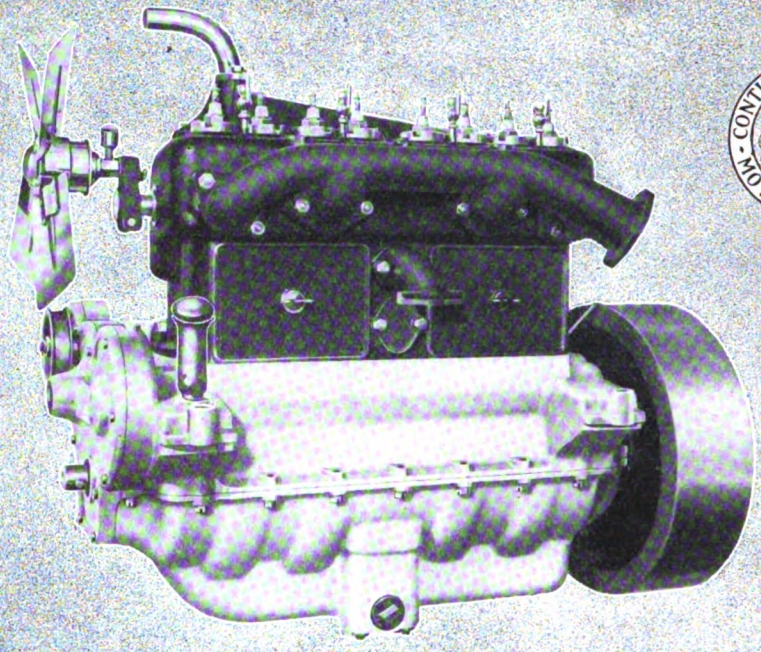

Continental Model C

Continental Motors

The world wide reputation of this make of motor is undisputed. Many of the prominent pleasure and commercial vehicle manufacturers have advanced the sale of their product by its use.

In booth 62 at the Chicago show

you will find all sizes of the new CONTINENTAL motors, both in unit power plant and independent construction. LET THIS NOTED MOTOR HELP MAKE A REPUTATION FOR YOUR CAR OR TRUCK. Contract early for your 1913 motor requirements.

Look for the new Six-Cylinder Continentals

They'll be at the show. You will find them up to the Continental standard in both workmanship and design.

GET BLUE PRINTS AND PRICES AT ONCE

Continental Motor Mfg. Co.

General Offices Muskegon, Mich.

FACTORY REPRESENTATIVE
K. FRANKLIN PETERSON
122 South Michigan Boulevard
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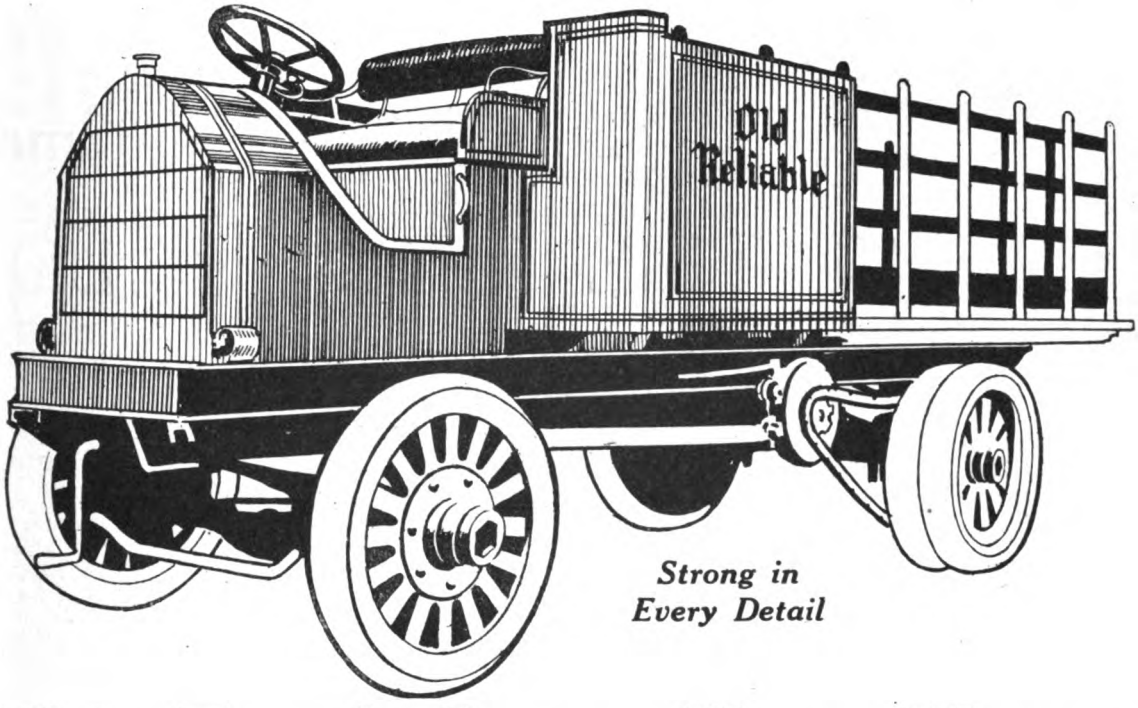

Strong in Every Detail

This Truck Saves Your Money On Every Mile

We will refer you to users who have gone over everything in the motor truck market and have decided on the "Old Reliable" against the field, have replaced other trucks with the "Old Reliable," knowing they could quickly make up the expense of changing with the perfect economy of "Old Reliable" operation.

See it at the Show, CHICAGO COLISEUM, Feb. 5-10.

Old Reliable 3½-5 Ton Motor Truck

Our 1912 factory has an output of five times that of the old factory—an evidence of the big and constantly increasing demand for this superb truck.

We Are Going to Make Strong Inducements to More Live Dealers on Our New 1912 Plant Output

Part of the production of the Henry Lee Power Company's new 1912 plant will satisfy overflow business on hand—and the balance contracts we are to make at once with new dealers in new territories. **We want more dealers at once.** We have a 3½-5 ton motor truck which is the superior of any other on the market, which will outsell any other in your locality. If you are in a position to consider this agency, we can furnish you at once complete specifications, records, photographs, catalog and our liberal proposition which makes extra strong inducements to any dealer. **One** of these trucks sold in your district will attract to you purchasers anxious to get the "mate" to it. It's a solid case of success based on merit—and you can take advantage of this present opportunity with great profit to yourself.

Write now for 'Old Reliable" specifications, records, photographs, catalog and dealer's proposition.

Send for the FREE Book which describes the perfections of "Old Reliable" construction

The "Old Reliable" Book shows you features in the construction of this truck not equaled in any other motor truck construction. The Book of the "Old Reliable" describes the magnificent features of construction in an "Old Reliable"; double gusset plate construction in the chassis; the splendid Kline brake, a 16 x 2 with large bearing surface and no gripping; springs so good they are guaranteed for life and anchored in such a way they cannot dislodge; a 5-ton truck tire outfit; the motor is of our own construction, cylinders from imported castings; bearings imported direct. These features emphasize why there is no overload restriction on the "Old Reliable," despite the fact that it is a 3½-5 ton truck. Get this Book at once—know the Truck the full knowledge of which means **absolute first choice.** Send for the Book **now.**

HENRY LEE POWER CO., 5233 Evanston Ave., Chicago

COUPON

HENRY LEE POWER CO.
5233 Evanston Av., Chicago

Gentlemen:

Kindly send me at once *free*, the Book and Specifications of the "Old Reliable" 3½-5 Ton Motor Truck. I want *proof* of its ton-mile economy.

Name .....

Address .....

Business .....

Please mention the "Power Wagon" when writing to advertisers.

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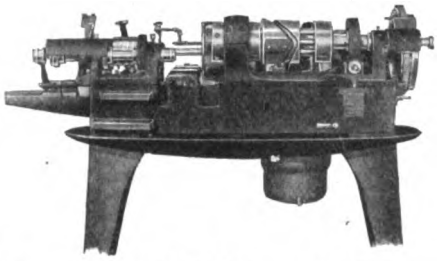


The Cleveland Automatic

LOOK AT THE PIECE BELOW

PIECE No. 443. Material, Chrome Nickel Steel; made on a 6″ Cleveland Automatic Turret Machine; 35 minutes for all operations. Send in samples or drawings; we will send you complete specifications explaining outputs, cost of machines and tools, etc., etc. Capacities of our machines ¼″ to 6¾″.

Operating Expense One Mill A Minute

Your Overhead Charges Added To The Above Will Give You The Exact Cost Per Piece

Cleveland Automatic Machine Company

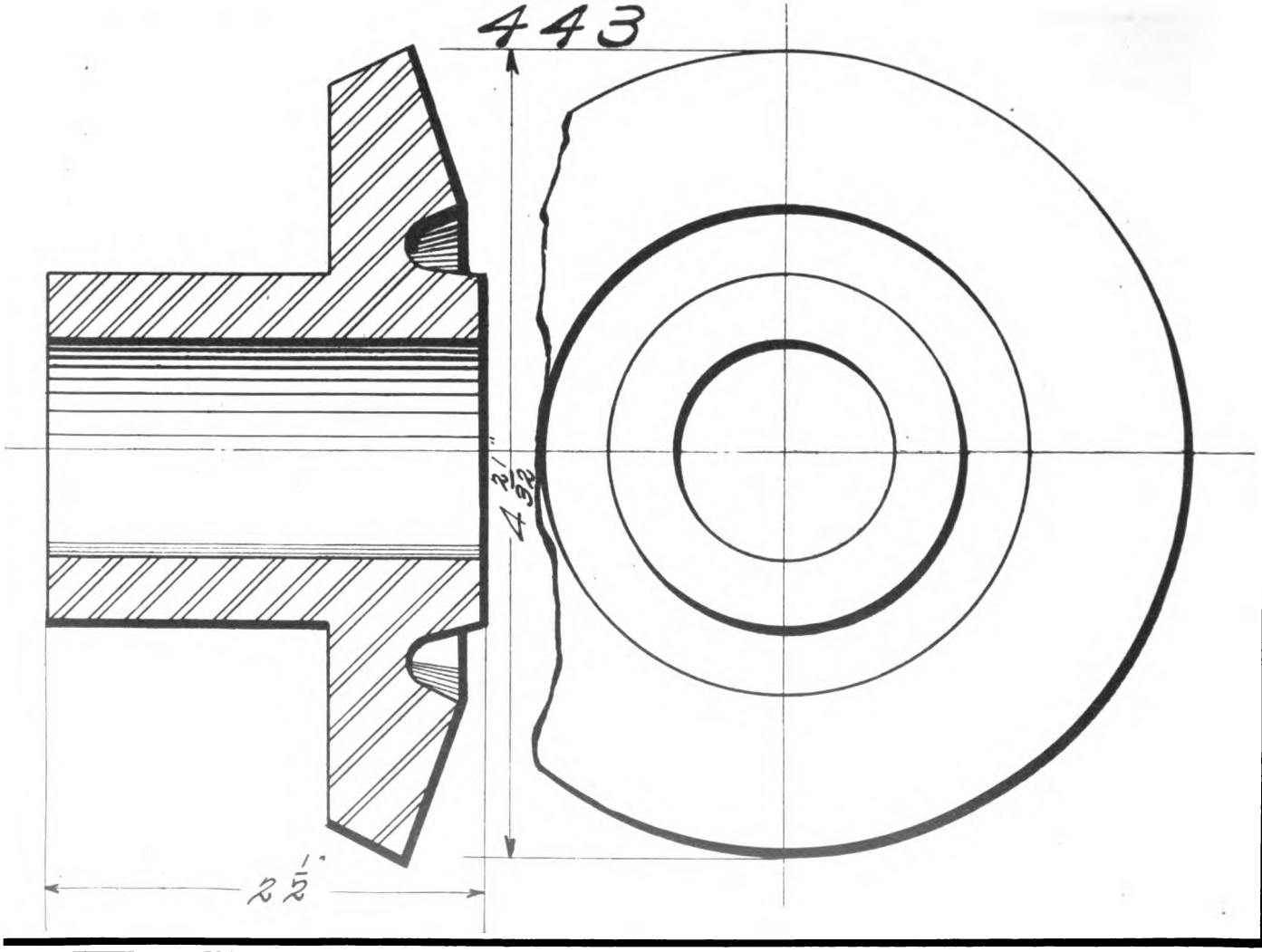
Eastern Representative
J. B. Anderson, 2450 North 30th Street, Philadelphia, Pa.

Cleveland, Ohio., U. S. A.

Western Representative
Herbert E. Nunn, 562 Washington Boulevard, Chicago, Ill.

Foreign Representatives

Chas. Churchill & Co., London, Manchester, Birmingham, Newcastle-on-Tyne and Glasgow. Messrs. Schuchardt & Schutte, Vienna, Berlin St. Petersburg and Stockholm, Copenhagen and Budapest. Alfred H. Schutte, Cologne, Brussels, Liege, Paris, Milan and Bilbao.



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Chase Motor Trucks

For Efficiency and Diversity of Usage

Everywhere You Go---They Go

Leaders in Economy, Durability and Simplicity

Where the Air Cooling System Reigns Supreme. A Few of the Many Chase Trucks in Los Angeles, Cal.

One way to gauge the success of a motor truck is to find out who is using it. No one buys a truck before studying the merits of other makes. Another way is to ascertain how it works under all sorts of adverse conditions including climate and roads.

The best test of all is to determine if the truck combines efficiency of service with diversity of usage. That is the **CHASE** test—the test that earns repeat orders.

That **CHASE** trucks satisfy this test is demonstrated daily in great centers and in small cities and towns by the very best class of users.

To many people, especially those in the large cities, it means a good deal to see **CHASE** trucks used by R. H. Macy & Co., Stern Bros., Rockwell Motor Transportation Co., Fleischmann Yeast Co., Berlin Dye Works, Bell Telephone Co., Smith Gray & Co., Singer Sewing Machine Co., and other great concerns.

To others, particularly those in small places, the message of **CHASE** superiority comes nearest home when they see their local hardware dealer, dry goods store, laundry, plumber, florist and baker discarding horses for **CHASE** trucks.

CHASE trucks are the ideal service type. They save time, money and worry.

Five Models—1000 to 4000 lbs. capacity. All Styles and Bodies.

Send for Catalogue for Facts and Figures on Motor Delivery Costs.

CHASE MOTOR TRUCK COMPANY

200 W. Jefferson Street, - - SYRACUSE, N. Y.

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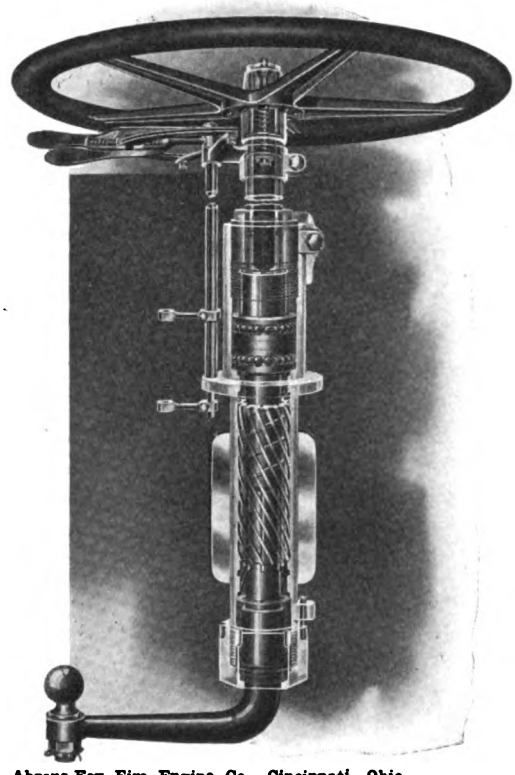

The "ROSS"

The only steering gear for motor trucks and power wagons.

90%

of the steering gears used on American made motor trucks are "Ross" product.

The following concerns use the "Ross"—"there's a reason."

Ahrens-Fox Fire Engine Co., Cincinnati, Ohio.
Alma Manufacturing Co., Alma, Mich.
American-La France Fire Engine Co., Elmira, N. Y.
American Motor Truck Co., Findlay, Ohio.
Argo Electric Vehicle Co., Saginaw, Mich.
Atlas Motor Car Co., Springfield, Mass.
Avery Co., Peoria, Ill.
B. F. Board Motor Truck Co., Alexandria, Va.
Bowling Green Motor Car Co., Bowling Green, Ohio.
Brodesser Motor Truck Co., Milwaukee, Wis.
Bronx Electric Vehicle Co., New York, N. Y.
Brown-Sautter Motor Truck Co., Newark, N. J.
The Buckeye Mfg. Co., Anderson, Ind.
Cartercar Co., Pontiac, Mich.
Cass Motor Truck Co., Port Huron, Mich.
Champion Wagon Co., Owego, N. Y.
Clark Delivery Car Co., Grand Crossing, Ill.
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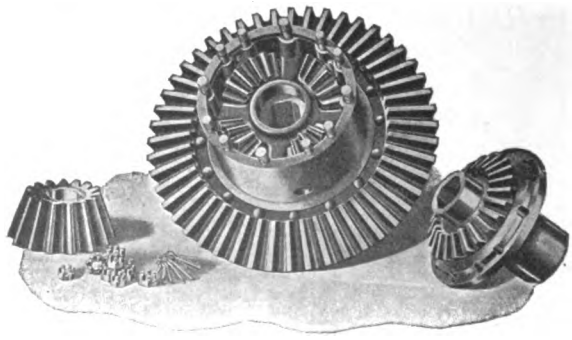
Diamond T Motor Car Co., Chicago, Ill.
Duplex-Power Car Co., Charlotte, Mich.
Eclipse Truck Co., Franklin, Pa.
Findlay Motor Co., Findlay, Ohio.
Franklin Boiler Works Co., Troy, N. Y.
The Garford Co., Elyria, Ohio.
Gramm Motor Car Co., Lima, Ohio.
Harder Auto Truck Co., Chicago, Ill.
Hart-Kraft Motor Co., York, Pa.
Harwood Barley Mfg. Co., Marion, Ind.
Henry Lee Power Co., Chicago, Ill.
Hercules Motor Truck Co., Chicago, Ill.
Herman Bros., Chicago, Ill.
Ice Manufacturing Co., New York, N. Y.
Kelly Motor Truck Co., Springfield, Ohio.
Kinnear Mfg. Co., Columbus, Ohio.
Kissel Motor Car Co., Hartford, Wis.
Knox Automobile Co., Springfield, Mass.
Kopp Motor Truck Co., Buffalo, N. Y.
Lauth-Juergens Motor Car Co., Fremont, Ohio.
Lord Baltimore Motor Car Co., Baltimore, Md.
Lyon Motor Truck Co., Pittsburgh, Pa.
Marquette Motor Vehicle Co., Chicago, Ill.
Martin Carriage Works, York, Pa.
C. F. Megow Co., Milwaukee, Wis.
Metzger Motor Car Co., New York, N. Y.
F. L. Moore Co., Los Angeles, Cal.
R. L. Morgan Co., Worcester, Mass.
Merchants' Automobile Co., Chicago, Ill.
Monitor Automobile Works, Janesville, Wis.
Moreland Motor Truck Co., Los Angeles, Cal.
Mogul Motor Truck Co., Chicago, Ill.
Nelson & Le Moon, Chicago, Ill.
New Haven Truck & Automobile Works, New Haven, Conn.
Ohio Electric Car Co., Toledo, Ohio.
Packers Motor Truck Co., Wheeling, W. Va.
The Pope Manufacturing Co., Hartford, Conn.
Randolph Motor Car Co., Flint, Mich.
Rapid Motor Vehicle Co., Pontiac, Mich.
The Rassel Motor Car Co., Toledo, Ohio.
Reliance Motor Truck Co., Owosso, Mich.
Robinson-Loomis Motor Truck Co., Minneapolis, Minn.
Sandusky Auto Parts & Motor Truck Co., Sandusky, Ohio.
Schmidt Bros. Co., Chicago, Ill.
Service Motor Car Co., Wabash, Ind.
Speedwell Motor Car Co., Dayton, Ohio.
Stephenson Motor Car Co., Milwaukee, Wis.
Stegeman Motor Car Co., Milwaukee, Wis.
Sternberg Mfg. Co., Milwaukee, Wis.
Teel Manufacturing Co., Boston, Mass.
United States Motor Truck Co., Cincinnati, Ohio.
Universal Motor Truck Co., Detroit, Mich.
Van Winkle Gin & Machine Co., Atlanta, Ga.
Victor Motor Truck Co., Buffalo, N. Y.
E. C. Walker Mfg. Co., Louisville, Ky.
Weber Auto Truck Mfg. Co., Louisville, Ky.
Whitesides Commercial Car Co., Franklin, Ind.

The "Ross" Differential Gear

For Commercial Trucks

We build differentials for 1, 2, 3 and 5 ton trucks—high class in every particular and made of the highest grade material. Superb workmanship—closest inspection possible.



Write For Blue Prints

Ross Gear and Tool Company

749 Main Street - - - Lafayette, Indiana

See Our Exhibits at the Chicago Shows, Coliseum, Space 105, Jan. 27-Feb. 10

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HERE IS THE BEST 1-TON MOTOR WAGON BUILT IN AMERICA!

CLARK DELIVERY CAR

THE LAST THING WE DID ON THE TRUCK WAS TO SET THE PRICE

A specially designed one-ton capacity Truck—Not a "converted" pleasure car

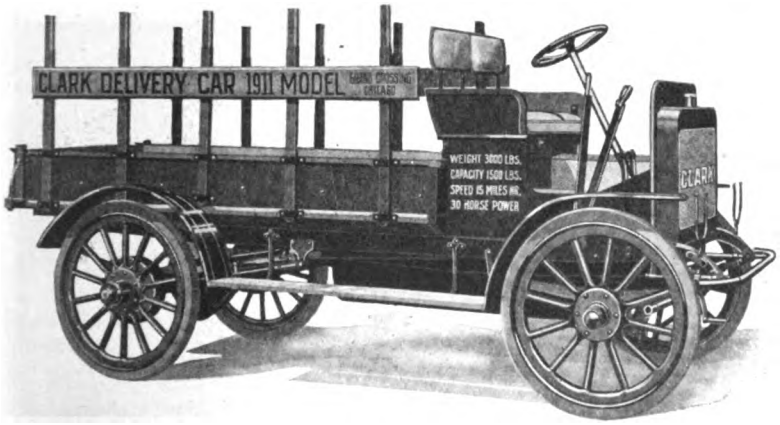
Four cylinder, 30 H. P. motor.
Full floating rear axle.
Shaft drive.

All moving parts enclosed guaranteeing long life and continuous service.

All parts interchangeable.

One ton Clark wagon hauling trailer in a Chicago Cemetery, Six teams of horses were displaced by this machine.

The Engineering Design and Construction of the "Clark" Guarantees CONTINUOUS DAILY SERVICE at MINIMUM OPERATING COST



Don't Write Us if you are looking for a Cheap 1-ton Truck.

If you want the best send for catalog.

We will Exhibit at the Chicago Show.

Choice territory open to responsible dealers.

CLARK DELIVERY CAR CO.

GRAND CROSSING, CHICAGO

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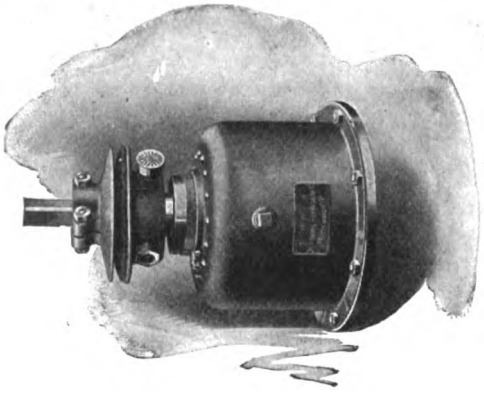
"Imitation is the Sincerest Flattery"

BUT

"The Laborer is Worthy of His Hire"

Merchant & Evans Co. hereby announce their intention of maintaining their rights in their patented motor car parts and accessories. These have been developed after extended research, experiment and expense, during the past five years to a degree of success that has made the following articles the **simplest, most complete** and **best** procurable in their lines in the country.

(1) **Evans Model "Hele-Shaw" Clutch.** Contracts have already been closed to put over 2,500 of these Clutches on 70 different makes of 1912 commercial cars, including the Alden Sampson, Mack, American—La France, etc., etc. Our Patent No. 795,974 covers absolutely the use of the **Corrugated Clutch Disc,** which in the judgment of our patent counsel covers **any cross section curved or dished form of Disc** as against a flat form. Our Patent No. 940,679 covers the Pressed Steel Housing Construction. Our allowed Patent Claims cover also our Universal type of Clutch.

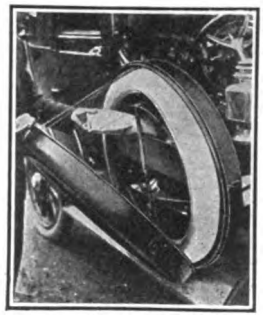


The long, large and wide-spread use of this Clutch has shown it to be the best device of the sort in existence, and most of our business comes from repeat orders. Every buyer of a commercial car needs this Clutch as a part of his equipment and its specification by individual buyers is constantly growing. We have recently notified three manufacturers of Clutches in a small way, that they must cease using dished plates at their and their customers' peril. We now give notice to the public generally of our rights and our intentions in this matter.

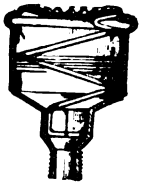
(2) **"Evans" Transmission.** The development of our Transmission Jackshaft (3 speeds and reverse, with two highest speeds direct-drive) has proceeded simultaneously with our Clutch work, until a number of makers of trucks are now using it with great success. Our Patent 905,677 gives us the exclusive right in this country to produce Transmissions with the **multiple direct-drive** feature, and we must repeat the warning given several manufacturers of our rights in this matter, and our intention to defend them.

We are now applying for a patent for a Chain Case in connection with this Jackshaft, the whole making the simplest and best truck construction possible

(3) **"The 'STAR' Tire and Tool Case"** is protected (a) by Patent No. 879,511 which absolutely covers any structure which supports tire shoes, and at the same time has an interior space or receptacle for tools, inner tubes or other use. The "STAR" Tire Case is further protected (b) by Patents No. 935,647 and (c) No. 947,527, covering the principle and the detail of construction. There are several devices that are now being sold in a limited way, which incorporate this principle and we have warned these manufacturers, and now warn the public in general including all individual buyers, car makers and agents, and accessory dealers of the danger of buying such articles except from us, or those under license from us.



This Case, both in its actual benefit to car owners and in adding to the appearance of the car, has not an equal; and its sale in the past year grew at a very rapid rate. It met universal approval, with agents of cars, owners, and drivers. Mr. Harry Payne Whitney and Mr. George Gould have ordered all their cars equipped with "STAR" Tire Cases. Various branches of the Packard, Peerless and other Car Co's now regularly advise buyers of their cars to use the "STAR" Case.



(4) **"M. & E." Grease Cup.** This is the simplest, cleanest, and really most effective Grease Cup now on the market. It has met with great and immediate success until now such concerns as the Pierce Arrow Co. for example are under contract with us for their entire supply for specific purposes for the year 1912.

We have strong patent claims allowed for this Cup, but recently have found an absolutely clear case of infringement of our rights. We can only notify the public generally that the Cup as illustrated herewith is an exclusive article of manufacture, and must not be duplicated in principle.

All of these articles will be exhibited at the Chicago Show on the following dates and space.

First Regiment Armory, Feb. 5th to 10th, Space No. 9 Gallery

MERCHANT & EVANS CO.

PHILADELPHIA, NEW YORK, BROOKLYN, CHICAGO, DENVER, KANSAS CITY, BALTIMORE

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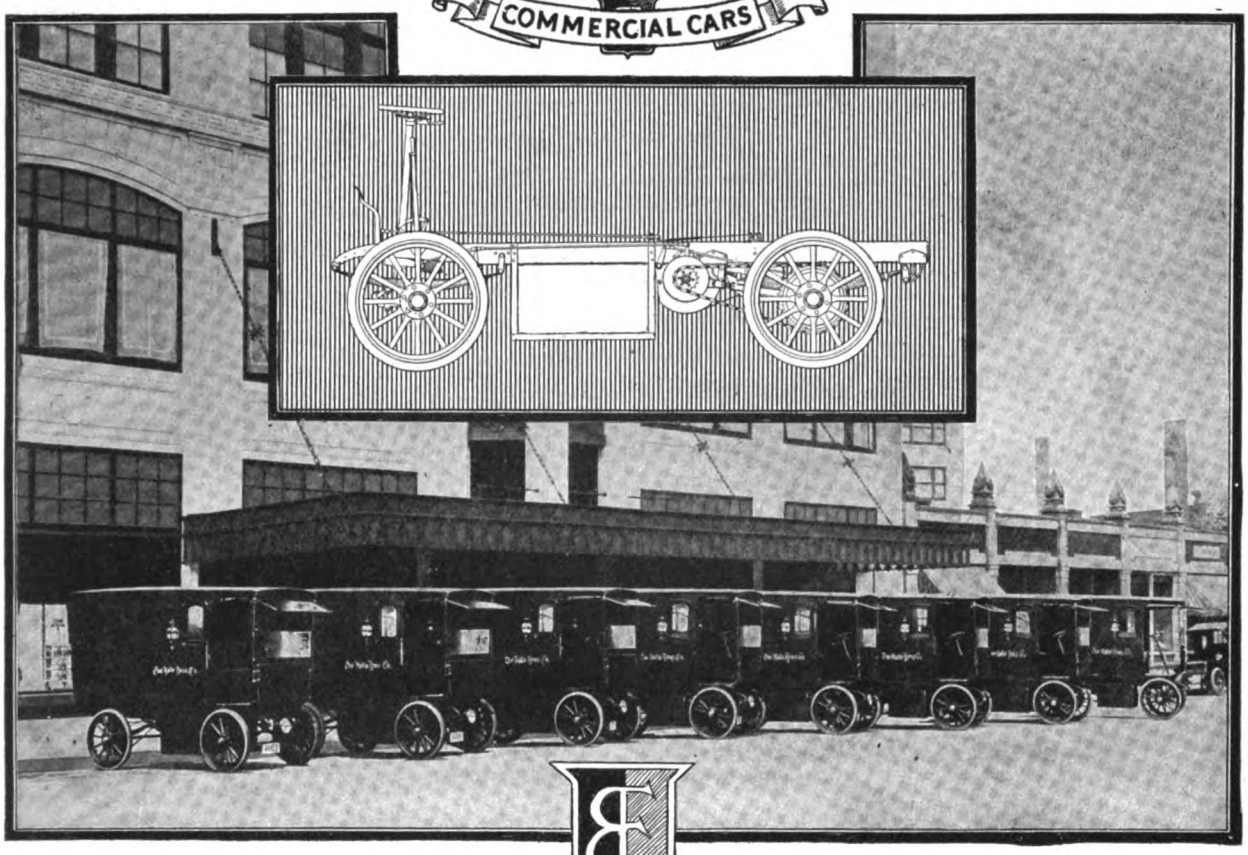
Baker Electrics

COMMERCIAL CARS



Installation of Baker Electric Trucks For a Cleveland Department Store

The practical man, always on the alert for better and cheaper methods to accomplish his purposes, will seize upon the opportunity which the Baker Electric Commercial Car affords him to reduce the expense of transporting his merchandise. Three sizes built; delivery wagon, light truck, heavy truck. Bodies to suit purchaser's need.

Write our Service Efficiency Department. It is in charge of a well-known advisory transportation engineer; can afford accurate, authoritative solution of any transportation problem.

THE BAKER MOTOR-VEHICLE COMPANY

COMMERCIAL CAR DEPARTMENT

69 West 80th Street, Cleveland Sixth City

NEW YORK, 1798 Broadway BOSTON, 17 Harvard Street CHICAGO, 319 Peoples Gas Bldg.

Other Representatives in Principal Cities

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"HAYES"

Mr. Buyer:

YOU want a truck that will stand the wear and tear of constant service, one that will stand up under adverse conditions and come back smiling. Don't overlook the wheels. Good wheels mean decrease of tire expense, absolute reliability under all sorts of treatment. Ask if they are Hayes *"Quality and Service"* Wheels.

If not, why not?

"Quality and Service"

Mr. Manufacturer:

START the New Year right. Specify Hayes Wheels and then point with pride to the running gear of your car and tell the buyer what Hayes *"Quality and Service"* Wheels mean. No order too large or too small. S. A. E. bands in all sizes on hand constantly. Let our experience tell you the right wheels for your car. Our engineering force is at your disposal. Our specialty is

WHEELS

Hayes Wheel Company, Jackson, Michigan

Visit our spaces at the Shows—Chicago, Jan. 26th to Feb. 2nd, second floor, space 133, Coliseum Annex; second week, Feb. 3rd to Feb. 10th, space 10, First Regiment Armory.

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An Engineering Masterpiece

The New One-Ton KELLY MOTOR TRUCK

The first Motor Truck to combine proper load distribution with the motor out in front under the hood

FORMERLY it was a choice of two evils: To get proper load distribution—78% on the rear wheels and 22% on the front wheels—it was necessary to put the motor under the seat and risk the possibility of the driver neglecting it. Or, place the motor out in front under the hood and let the rear wheels carry 85% to 95% of the load—with a consequence that in plowing through mud, snow and sand, the rear wheels would bury themselves and the truck be unable to pull itself out.

This new one-ton Kelly solves the problem. The motor, perfectly accessible, out in front under the hood, where it is certain to receive the best care and attention—**and** proper load distribution (22% in front, 78% rear) maintained.

Kelly Motor Trucks have walked away with practically every important motor truck contest held during the past two years. Statements of Kelly Truck users prove the Kelly contest records to be merely samples of the every day **service** records of the Kelly. The Kelly is the master truck—and this new one-ton model is the Kelly masterpiece.

The Kelly Motor Truck is built for **your** business. We have full information on what it is doing in **your own line.** Write for this information, and ask for special **detailed** information regarding the new one-ton model.

KELLY MOTOR TRUCK COMPANY

SPRINGFIELD **OHIO**

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SHELDON

One-Ton Equipment

IT'S READY!

Consists of

Front Axle, I-Beam style, with spring pads forged integral.

Rear Axle, rectangular shape, with integral spring pads, brakes and radius rods.

Jack Shaft with Transmission.

Springs, and all necessary brackets, shackles, clips, etc.

This material is thoroughly tried out, and you can have a complete truck on the market in short order. What we offer you here has been tried and tested, not by the user alone, but by ourselves. Let us send Bulletins on all this material.

SHELDON AXLE CO.

WILKES-BARRE, PA.

Chicago Branch:
68 East 12th Street

Detroit Branch:
1215 Woodward Ave.

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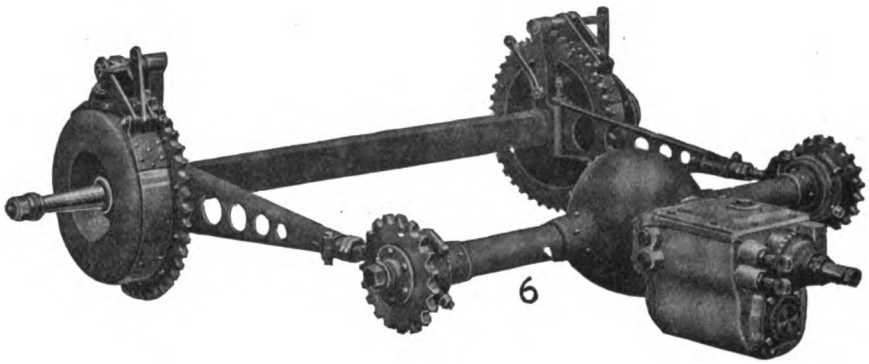
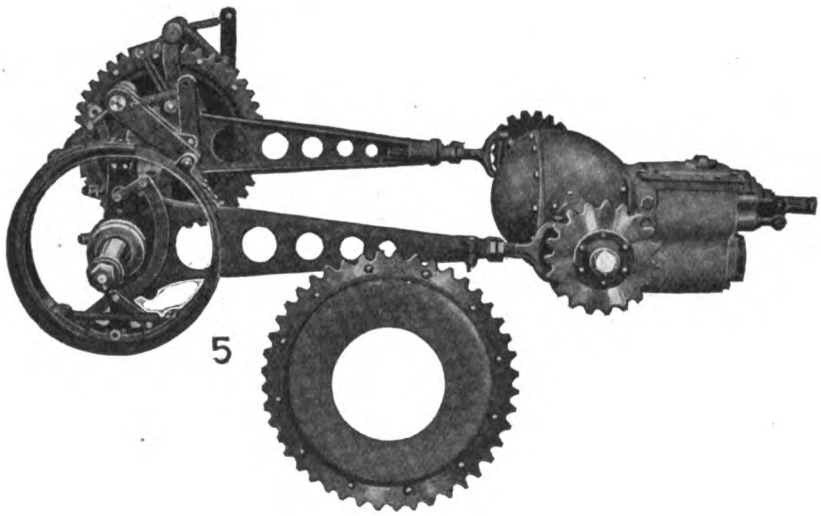
SHELDON

FRONT AXLE No. B-129

One Ton Equipment, D-13



Brakes D-132, Jack Shaft TD-130, Rear Axle B-139.



Same equipment showing brake drum and sprocket removed.
All shown on Bulletins. Mailed free on request.

SHELDON AXLE COMPANY

WILKES-BARRE, PA.

CHICAGO BRANCH: 68 East 12th St. **DETROIT BRANCH: 1215 Woodward Ave.**

Please mention the "Power Wagon" when writing to advertisers.

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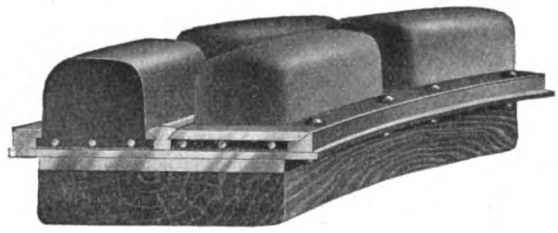
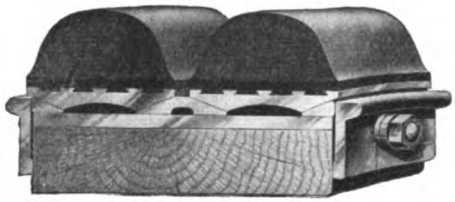
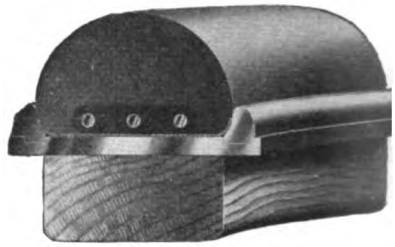
A Tire for Every Service



Goodyear Individual Block Tire



Goodyear Demountable 10,000-Mile Tire



Goodyear Hard Rubber Base Tire

GOODYEAR

TO MEET the varied requirements of motor truck owners, we now make six excellent truck tires.

Each is the best truck tire that our engineers know how to build.

Each is the outcome of 13 years' experience. Each is the product of master mechanical minds; the result of thousands of scientific tests.

Each is a tire fit to be classed with the famous Goodyear No-Rim-Cut pneumatic tire.

And each was specifically built for American **streets and roads,** by American **engineers.**

Our Solid Demountable 10,000-Mile Tire

This tire is one of the greatest time and money-savers ever invented. No longer need your truck be laid up. When a tire wears out, simply jack up wheel, unbolt rim, take off rings, slip off tire and put on another one. All done quickly by **your** man in **your** garage during **spare** moments—jack, chisel and wrench are the only tools needed.

And this tire has none of the shortcomings of the ordinary truck tire. **It can not wear out at the base.** In fact, we guarantee its **minimum** service to be **10,000 miles.**

It is furnished in **twin** or **single** form. It is standard in all parts. Fits any standard S. A. E. wheel, on which can be fitted the Goodyear No-Rim-Cut pneumatic tire.

Our Individual Block Tire

Another popular tire for heavy trucks—another one on which the base wears as long as the tread.

Each block has its own **individual** fastening—a rectangular metal plate which fits firmly over the extended base of the block. To release block, it is only necessary to loosen two bolts, lift a single plate and slide it from under the center ring under which it is automatically wedged.

Thus, in removing a damaged block, you don't have to loosen **several** blocks.

And this **individual** fastening holds each block securely. Block can not work loose or chafe and wear itself out. The commonplace type of fastening, which holds **several** blocks, is impracticable because some blocks require more pressure than others, especially after having been used.

With this Tire on your truck, the only extra tire equipment needed is a few extra blocks.

It is much less expensive and troublesome to put on a new block occasionally than to be constantly repairing tires, buying new tires and making tire replacements.

Neither expert skill nor great physical strength is required to replace a block. A small clamp and

GOODYEAR MOTOR

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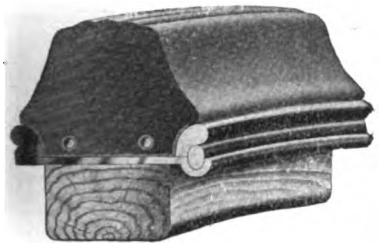
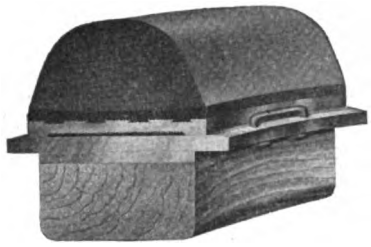
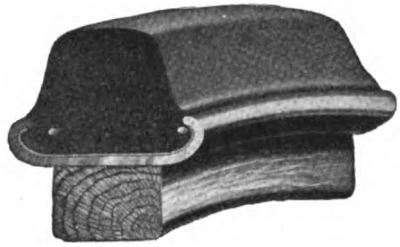
—Six to Choose From



Goodyear No-Rim-Cut Solid Truck Tire



Goodyear Metal Base Truck Tire



Goodyear-Motz Motor Truck Tire

GOODYEAR

wrench is all you need. Anybody can do it quickly and easily.

Four Other Tires

Each of the four other tires here illustrated has its particular merit—its particular duty.

The Goodyear Hard Rubber Base Tire and the Goodyear Metal Base Tire are popular among owners of heavy trucks. We were the first manufacturers in America to make **hard-rubber** base truck tires.

The Goodyear No-Rim-Cut Solid Tire and the Goodyear-Motz Tire are pacemakers among tires for light delivery cars. Each is easily applied; each possesses amazing resiliency; each gives the utmost mileage.

Let Our Experts Solve Your Tire Problems

Choosing the right tires for his motor truck is a problem which no individual truck owner should ever attempt to solve by himself. It takes too much time; involves too much risk of costly experimenting.

The simple, inexpensive way is to consult our tire experts. Tell them what kind of a truck you have; the size and style of wheels; for what purposes your truck is used; what kind of streets and roads you have.

With such information before them, these engineers who have devoted their lives to tire problems, will be able to tell you exactly the tire you need—the tire which will give you the most mileage per dollar invested—the tire which protects the mechanical parts of your car—the tire which is least troublesome—which is easiest applied and removed.

This information, which may be worth a great many dollars to you, can be secured merely for the asking. Our expert advice is at your service. Write us. Address

The Goodyear Tire & Rubber Company

Clayton Street, Akron, Ohio

Branches and Agencies in 103 Principal Cities

We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits

Main Canadian Office, Toronto, Ont. **Canadian Factory, Bowmanville, Ont.**

TRUCK TIRES

Please mention the "Power Wagon" when writing to advertisers.

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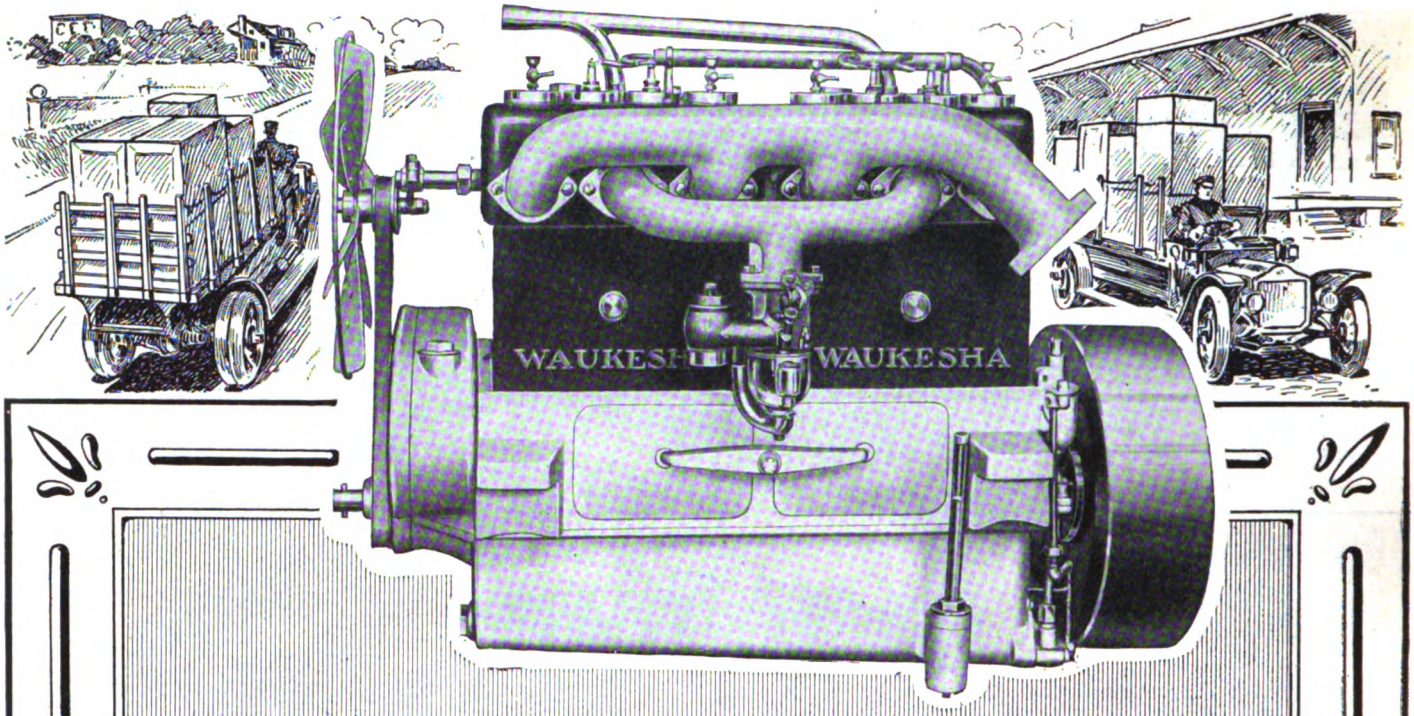

WAUKESHA

4¼×6¾" LONG STROKE TRUCK MOTOR

An Exceptional Motor

THE STRONGEST SELLING ARGUMENT FOR A CAR IS A Waukesha Long Stroke Motor.

It is a manufacturer's positive guarantee. It means a car with long life and an appetite for hard work.

It takes the hills as easily as the level, because the oiling system is adjustable to every variation in grade or load.

The bearings have three times the wearing quality of ordinary bearings. They are made of our own patent process metal. And the valve passages are designed for the most economical performance.

The car with a Waukesha Motor is an **honest** car. See that your car is equipped with it. Made for commercial or pleasure cars. Fifteen sizes, types and models. All information on request.

CHICAGO SHOW SPACE—Booth 118, Coliseum Annex, 2nd Floor.

WAUKESHA MOTOR Co
WAUKESHA WISCONSIN

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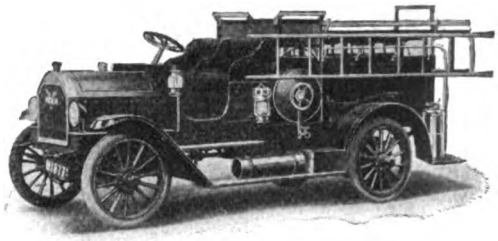
Victor Combination Hose and Pumping Engine

VICTOR



Victor Combination Hose and Chemical Truck

Victor 1500-lb. Wagon

In Municipal and Industrial Service VICTOR TRUCKS are making good

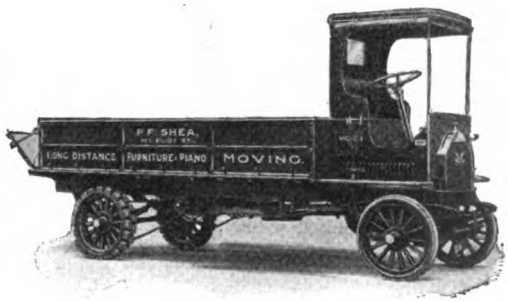
Victor One-Ton Truck

In fire service, where dependability and reliability are of the first importance, the "sure-to-get-there" feature of the Victor has won a merited approval.

In industrial and mercantile service the good qualities of the Victor have won a reputation for economy—durability, second to none.

In your service, the Victor will win this same reputation. You can secure a Victor in the following carrying capacities: 1500 lbs., one ton, two tons, three tons, five tons, seven tons.

Victor Two-Ton Truck

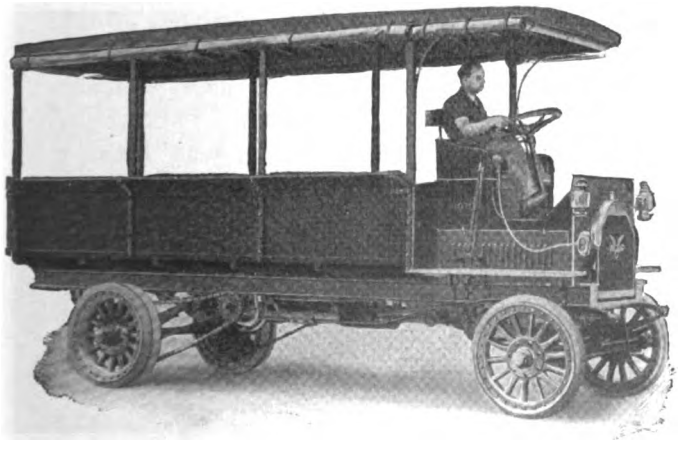


Victor Three-Ton Truck

Write today for catalogue

Victor Motor Truck Company

1008 Ontario Street, Buffalo, N. Y.



Victor Seven-Ton Truck

Victor Five-Ton Truck

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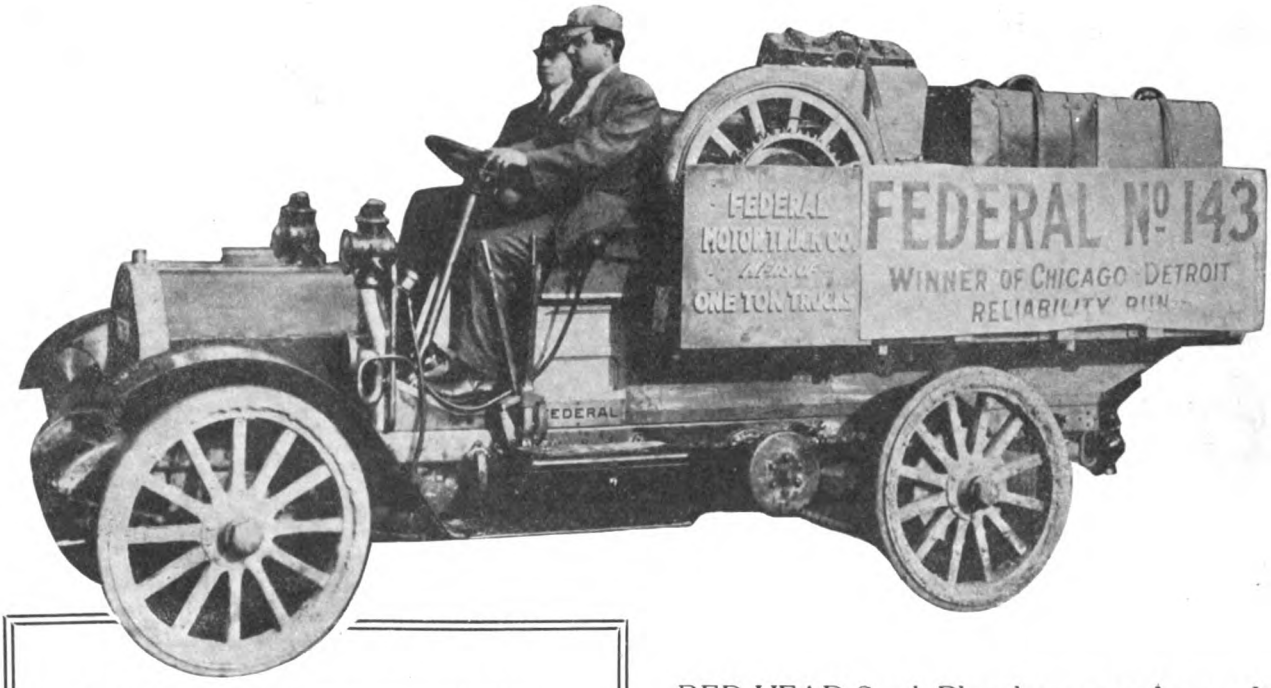
The Burden Bearer in the Glidden

Red Head



FEDERAL MOTOR TRUCK COMPANY
MANUFACTURERS OF ONE TON TRUCKS

Subject: Detroit, Michigan, U. S. A., Nov. 9, 1911.

Emil Grossman Co.,
New York, N. Y.,

Gentlemen:—You might be interested in knowing that our one-ton truck which recently went through the entire Glidden Tour, carrying over a ton of baggage, was, like all Federal trucks, equipped with your Red Head Spark plugs.

This trip was exceptionally hard on account of the severe road conditions encountered. Through Virginia and North Carolina we had some very hard grades and very hard rains, and through Florida, heavy sands, so that our motor was working at maximum power and reliable ignition was absolutely necessary. We had absolutely no trouble with your plugs either from short circuiting or fouling, although at times, we found it advisable to use considerably more cylinder oil than we would use in ordinary service.

Yours very truly,
FEDERAL MOTOR TRUCK CO.
RFM/FG. Per R. F. Moore.

RED HEAD Spark Plugs have **earned** a **regular place** in other high grade motor trucks by **proving** their efficiency and superiority. Used for the **third successive** season in Grabowsky trucks, and with absolute satisfaction by the manufacturers of the Kissel, McIntyre, Autocar, Hatfield, Atterbury, Mais, Modern Trucks, not to mention more than fifty automobile and gas engine manufacturers who use RED HEADS as regular equipment. The RED HEAD is powerful enough to bear your ignition burdens and efficient enough to solve your ignition problem.

All sizes—$1.00—Porcelain or Mica.

EMIL GROSSMAN COMPANY, Mfrs.
250 W. 54th Street, New York
Western Branch and Factory, 844 Woodward Ave., Detroit

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Mack and Saurer

"Leading gasoline trucks of the world"

To dealers in motor trucks and to others who would like to become dealers

For the man who is big enough to look at the transportation problems of business concerns in a large way, there is a great opportunity to serve these concerns and build up a highly satisfactory business for himself.

The International Motor Company is the only organization in a position to offer the business public *positive and impartial solution of transportation problems.*

Positive: This is an association of the only truck manufacturers whose trucks have been in actual service 12 to 17 years—long enough to prove that they pay for their initial expense by length of life, economy and continuous service.

Impartial: It is the only organization, devoted exclusively to the manufacture and sale of motor trucks, which offers trucks of every wanted size, from 1 to 10 tons capacity; manufactures every type of body in its own plants, and is therefore equipped to supply the most economical sizes and styles of trucks for the various kinds of merchandise.

Sizes: 1, 1½, 2, 3, 4, 4½, 5, 6½, 7½, and 10 tons.

These leading gasoline trucks of the world are brought together under such financial connections as absolutely to ensure the maintenance of the highest standards of manufacture and service attention.

Dealers, and men who wish to become dealers, should apply for agencies of the International line. You realize the importance of dealing with one company which has trucks of proven value and is prepared, through all sizes and styles, to meet every condition of delivery.

But—we want *the* man; the man who is big enough to see that this is not an ordinary proposition, and who has the energy and capital to enable him to get for himself, his customers, and ourselves, the rewards of this important connection.

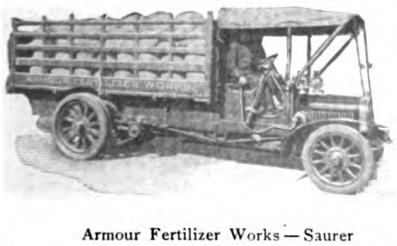
Arrangements have been made for more than half the available centers. Applications will be entertained for the remaining cities.

International Motor Company

General Offices: 57th and Broadway, New York

Works: Allentown Pa.; Plainfield N. J.

Sales and Service Stations: New York Boston Chicago Philadelphia San Francisco other large cities.



Armour Fertilizer Works—Saurer

Pabst Brewery—Mack

Bush Terminal Co—Saurer

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The International Auto Sightseeing Transit Co.
(INCORPORATED)

"TOURING WASHINGTON"
"TOURING ARLINGTON"
"TOURING INTERIOR PUBLIC BUILDINGS"

LARGEST AND BEST EQUIPPED SERVICE IN AMERICA
SPECIAL RATES TO PARTIES, TOURS, CONVENTIONS, WEDDINGS, ETC.

MAIN OFFICE: 600 PENN. AVE. N. W (HOWARD HOUSE) TELEPHONE, MAIN 1074-1075

WASHINGTON, D. C.
Aug. 17th, 1911.

James L. Gibney, & Bro.,

Philadelphia, Pa.

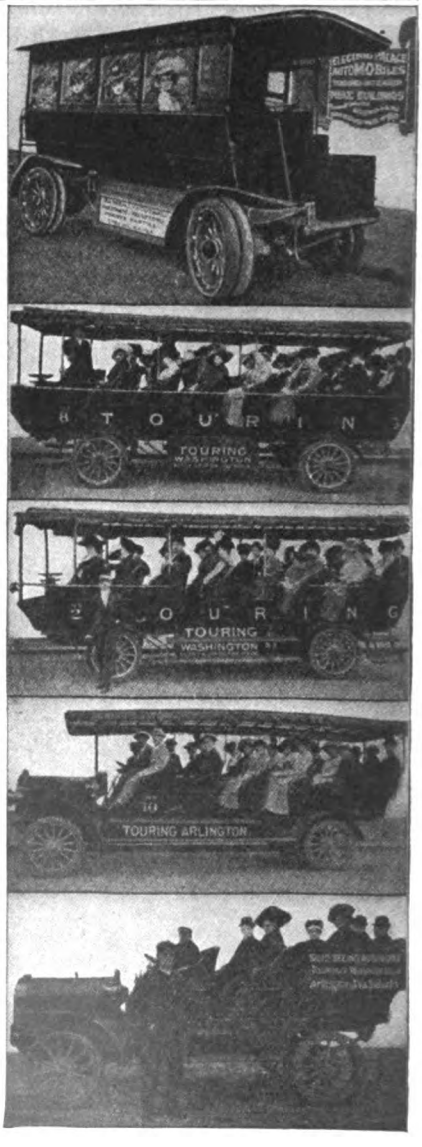
Gentlemen:

We are shipping you today three wheels for you to apply with your wireless tires for our Mack Truck. We have had this set of tires on our truck now thirteen months and have received out of them over 15,000 miles and have one still on. I hope the new one that we are now giving you an order for will give us half of the service the first set has, and we will be perfectly satisfied.

We shall change all our coaches in the future and apply with wireless tires as fast as we need them.

Please return wheels as soon as you can as this truck we use every day and can't afford to be delayed as we use this for our Suburban Trip to Arlington, Va. three times a day.

Yours respectfully,
Samuel Gassenheimer
Gen. Mgr.



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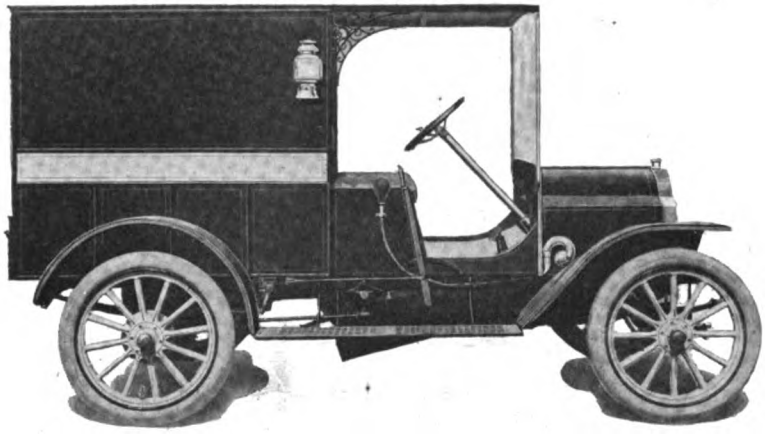
Here Is the 1912 Sensation of the Motor World



Panel Body; Four Cylinder, 20 H. P. Motor; Bosch High-Tension Magneto; Pneumatic Tires, 32x3½ Inches—Price Complete, $850.00. Solid 2½ Inch Truck Tires—Price Complete, $800.00.

COMMERCE CAR

Designed for the delivery of 1,000 pound loads at *minimum operating cost* and *low initial investment*

Bad roads and steep hills have no terrors for the "Commerce"

WE HAVE SOME CHOICE TERRITORY
LEFT FOR GOOD, ACTIVE DEALERS

See the COMMERCE at Chicago Show

Write for Catalog

The Commerce Motor Car Company

General Office: 634-640 Penobscot Bldg. - Detroit, Michigan

Please mention the "Power Wagon" when writing to advertisers.

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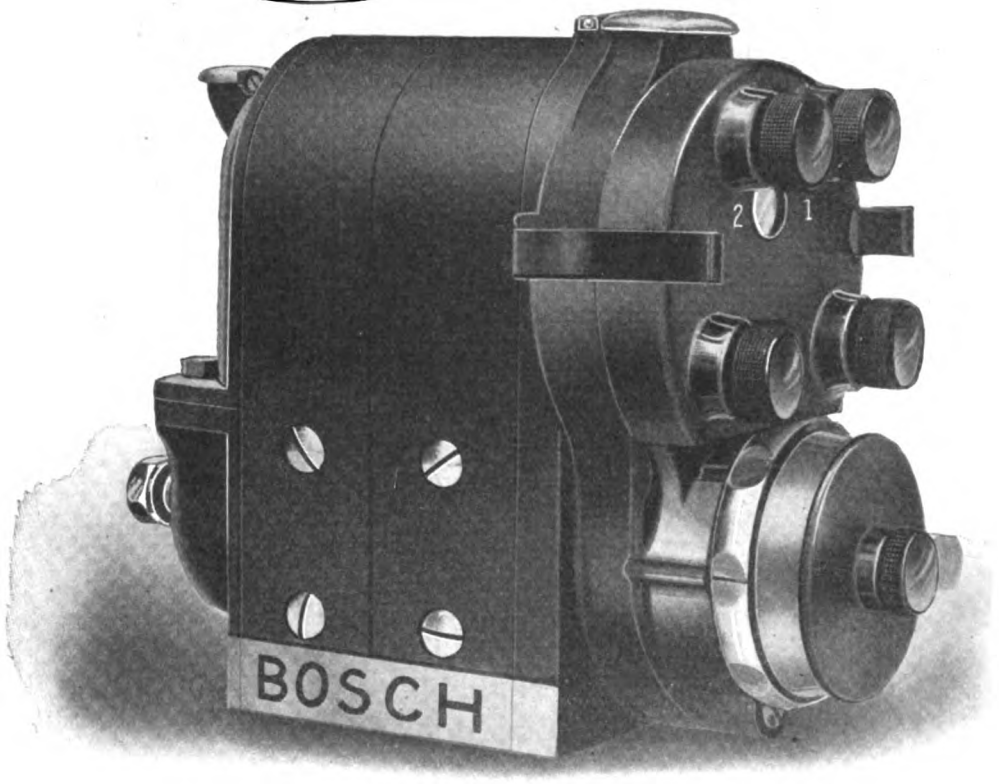
BOSCH

FOR 1913 PRODUCTS



MANUFACTURERS—The Bosch Enclosed Type Magneto illustrated, in addition to maintaining the high degree of excellence characterizing Bosch Products during the past twenty-five years, is absolutely oil, dust and water proof.

BOSCH SHOULD BE PART OF YOUR 1913 EQUIPMENT

First Western display of these types will be during the Chicago Show, Space No. 99, Jan. 27th-Feb. 10th.

BOSCH MAGNETO COMPANY, NEW YORK
DETROIT CHICAGO SAN FRANCISCO TORONTO

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KisselKar 3-Ton Truck

The Truck of Demonstrated Economy

In competitive tests, the KisselKar Truck has demonstrated itself to handle full capacity loads on all roads, using from 15% to 20% less gasoline than average trucks. Considering the yearly mileage of a truck in daily service, this is a tremendous economy—a vital reason why you should investigate the KisselKar Truck.

KISSELKAR TRUCKS

1½ to 2, 3, 4, 5 Ton Trucks, Delivery Wagons, Fire Department Wagons, Etc.

The KisselKar lock on the differential of heavy duty models means dependability under all road and weather conditions. When one wheel on ice, in snow, mud or hole, spins rapidly, absorbing all the power, the driver, with foot on lever, locks both wheels together as on a solid axle, compelling equal distribution of power, the wheel on solid ground supplying the traction. The simple engine, with gear-driven oiling system, makes any KisselKar Truck dependable in the hands of an average driver.

Write for KisselKar Portfolio

Describes the entire KisselKar line—pleasure cars, trucks, etc. The commercial car section gives comparative figures of costs between horse and power delivery and haulage—free on request.

Kissel Motor Car Co., 158 Kissel Ave., Hartford, Wis.

Branches and distributors in Boston, New York, Philadelphia, Cleveland, Detroit, St. Louis, Dallas, El Paso, San Antonio, New Orleans, Chicago, Milwaukee, Kansas City, Omaha, Butte, Denver, San Francisco, Los Angeles, Seattle, Portland, Minneapolis, Duluth, Buffalo, Pittsburgh, Hartford, Conn., New Haven, Albany, Troy, Montreal, Quebec Toronto, Winnipeg, and other principal points throughout the United States.

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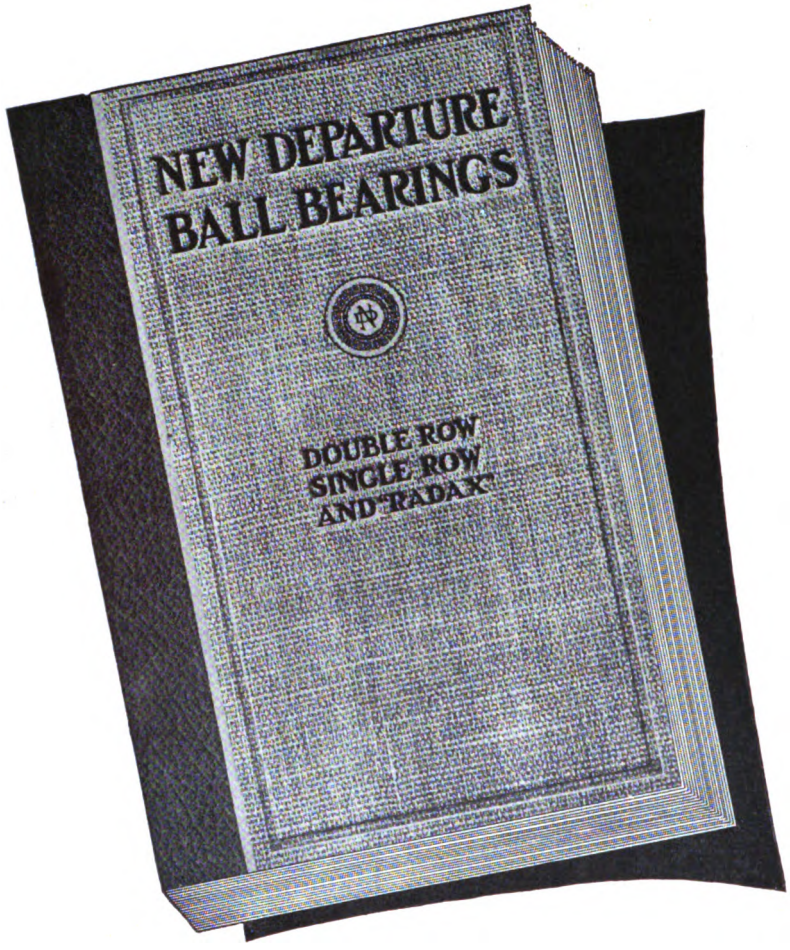

NEW DEPARTURE BALL BEARINGS

1912 Catalog---Treatise, Engineering Edition

A concise, comprehensive and complete volume prepared by our staff of engineers, particularly for automobile designers and builders.

It contains the following:

Detailed descriptions of the New Departure Double Row Ball Bearings, combined radial and thrust; New Departure Single Row Ball Bearings, high grade and strictly radial; New Departure "Radax" Ball Bearings, radial and axial, taking thrust in one direction only.

Fully illustrated exposition of ultra-precise methods for gauging during processes of manufacture and final inspection.

Treatise on the superior efficiency of New Departure Ball Bearings for all bearing points of motor vehicles of every description, illustrated by representative examples of advanced American and foreign practice.

Carefully worked out suggestions for mounting New Departures, proper care and lubrication.

Comprehensive colored charts for determining maximum and minimum radial and thrust load carrying capacity of all New Departure Ball Bearings.

Lay-out tables of size recommendations for all points of the car; a compilation reflecting extensive experience of leading engineers in the automobile industry.

Table of standard press and push fit on shaft and in the case. Full descriptive tables of New Departure Ball Bearings with all measurements given in both the inch and metric systems.

Inquiry blanks for purpose of furnishing data desired by our engineering department when giving cooperative consultation service. These blanks are supplemented by diagrammatic lay-outs of cars and are provided to facillitate inquiries.

A copy of this book will be mailed free on request, to any manufacturer, mechanical or designing engineer or purchasing agent.

New Departure Headquarters at Chicago Show will be at Congress Hotel Annex, Floor J, Suite 1, 2 and 4

THE NEW DEPARTURE MANUFACTURING COMPANY

BRISTOL, CONNECTICUT **Western Branch, 1016-17 Ford Building, Detroit**

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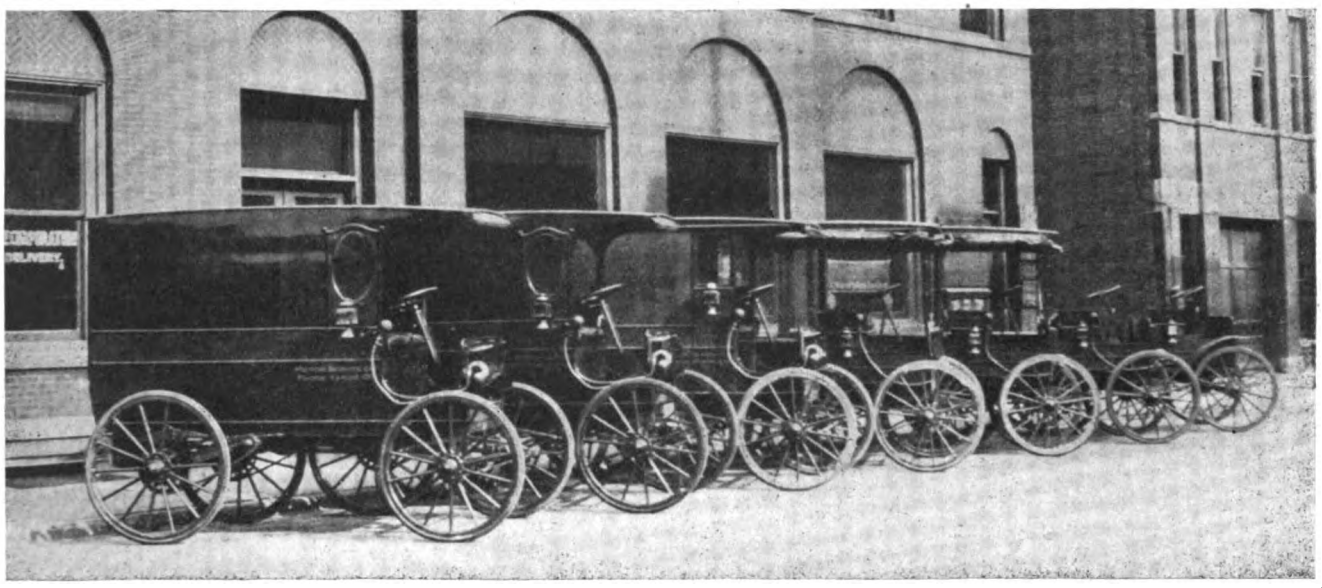
MERCURY TRUCKS

WILL BE EXHIBITED AT THE CHICAGO SHOW



Part of the large fleet of Mercury Light Delivery Trucks used by the Motor Service Corporation, Chicago.

The Dealers' Profit Depends Upon the Number of Cars He Sells.

Selling pleasure cars is like running a summer hotel.

Business is confined to a limited season, then nothing doing the rest of the year.

Mercury Light Delivery Trucks can be sold every month in the year.

Any dealer can sell one or two trucks on his own recommendation, regardless of the merit of the car.

But — to get repeat orders, the truck must make good and stay sold.

Every owner of horse drawn vehicles is a prospective purchaser of one or more Mercury Trucks.

His Volume of Sales Depends Upon the Kind of Cars He Sells.

They are designed and built for business purposes—not remodeled pleasure cars.

Air cooled motor—no water to freeze, no annoyance caused by leaky radiators.

Solid Tires — no punctures or blow-outs. Tire cost less than one cent per mile.

Every purchaser of Mercury Trucks becomes an enthusiastic Mercury booster.

Because they make good, stay sold and will do their work quicker, better and cheaper than anything else on wheels.

There Are More Mercury Light Delivery Trucks Used in Chicago Than Any Other Kind.

Write for Catalogue Booklet "What They Are Made Of" and Agency Proposition.

The Mercury Manufacturing Co.

4108 So. Halsted St, CHICAGO, U. S. A.

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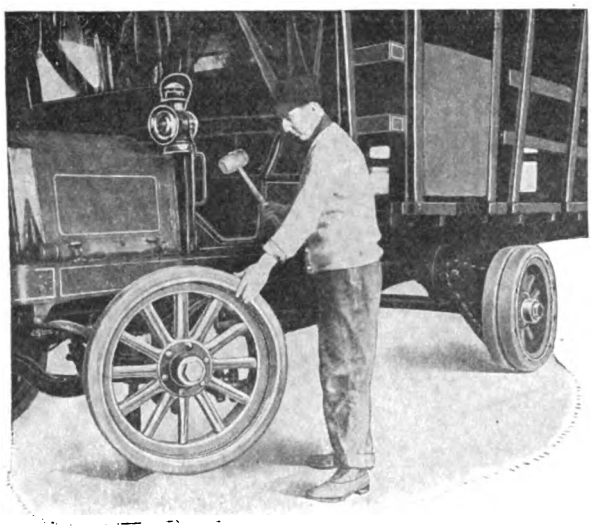


The readiness and dispatch with which Wire Mesh Base Tires may be taken off or put on at any place or time is but one of their unequaled features. It is not necessary to limit their wearing surface to avoid rust. No complex mechanism is employed. A mallet does the work.

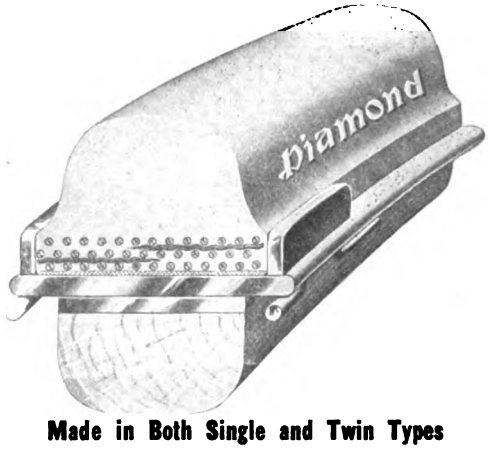
Diamond

Demountable Spliceless

Wire Mesh Base Tires

Correct Design and Correct Construction

to meet American truck **service conditions.** Not a new thing, but a tire brought to an unequaled efficiency by years of research and development.



Made in Both Single and Twin Types

Our literature gives valuable information on truck tire equipment. Write.

54 DIAMOND SERVICE STATIONS—maybe more tomorrow—do more than sell tires. THEY TAKE CARE OF DIAMOND TIRE USERS.

THE DIAMOND RUBBER COMPANY

AKRON, OHIO

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The Federal sets the final price of standard one-ton trucks—$1,800

Federal One-Ton Truck Chassis, 144 inch wheelbase, including seat, $1,800.
Body type at purchaser's option.

Wheelbase, optional 110 inches or 144 inches. Motor—4 cylinder, 30 horsepower; magneto, high tension; Clutch, 16" cone; Transmission, three speeds forward and reverse; Timken bearings in wheels; Tires, solid 36" x 3½" front; 36" x 4" rear.

FEDERAL ONE TON TRUCK

It is the same Federal Truck that has been in operation and demand for two years; that has stood up and proved up; that has met every hauling test; that has solved every hauling problem.

It is the same Federal that was awarded the Grand Trophy in the Chicago-Detroit-Chicago Truck Run last summer.

It is the same Federal that in the last Glidden tour carried more than a ton of baggage 1,500 miles in eleven days over all sorts of roads and finished with the touring cars. No truck had ever before even completed the Glidden tour on time.

It is the same Federal that has for two years been setting new marks for strength, durability, speed and cost-reduction for the American business man.

Here is YOUR OPPORTUNITY—to buy for $400 to $500 less than the price of any other truck of the same rating, a one-ton truck that is the Standard of Truck-Efficiency, Truck-Reliability and Truck Economy

HOW CAN THE FEDERAL BE SOLD FOR $1,800 NOW?

Because an enormously increased demand has brought about an enormously increased production.

Because we buy materials now in enormous quantities.

Most important of all, because we have specialized in one product, concentrated all our factory force, energy, experience, engineering skill and capacity in the one-ton Federal Truck. The new price—$1,800—is the Achievement of Specialization.

The 1912 Model of the Federal will be on exhibition at Chicago Coliseum, Section N, February 5-12.

If you are unable to see the Federal at this show, write us for Federal literature.

FEDERAL MOTOR TRUCK CO., 112 Isabella Street, DETROIT, MICH.

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POLACK TRUCK TYRES

by their **absolute guarantee** assure a lower cost per mile than any other tyre made.

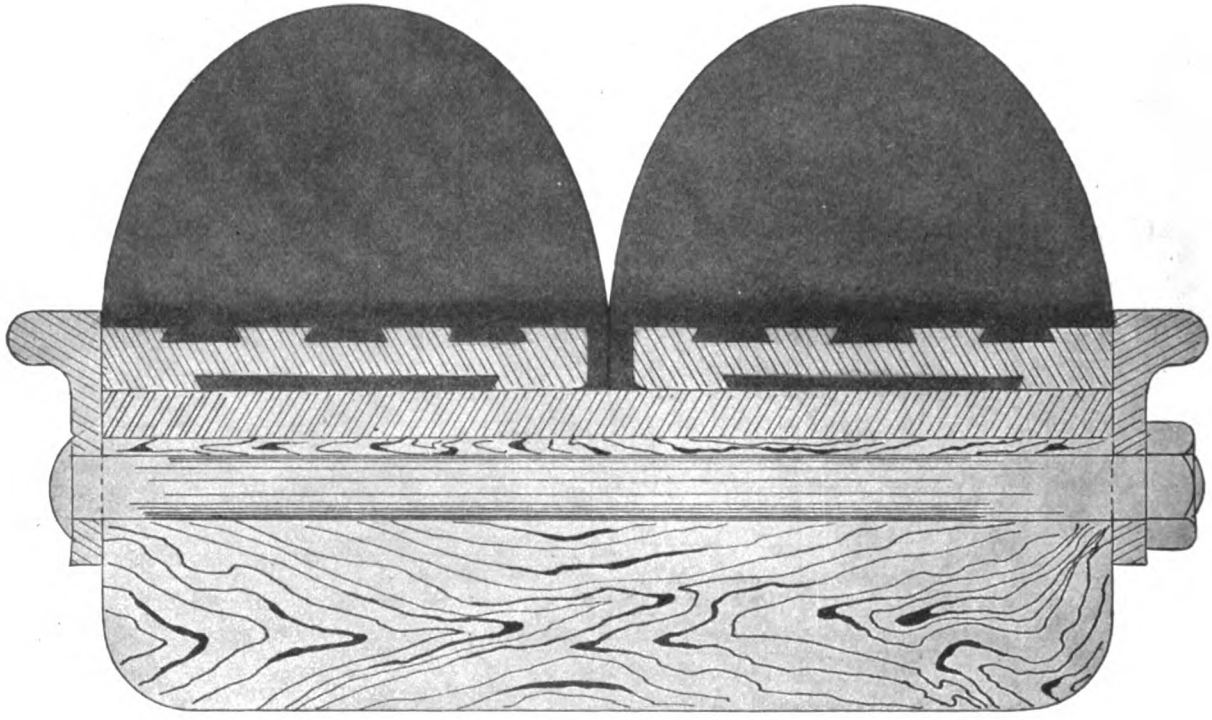
If fitted with the sizes which we recommend for a three-ton truck the tyre cost per truck mile is **5¼** cents, **maximum.**

For a 5-ton truck the **maximum** tyre cost is **7¾** cents per mile.

This cost will be reduced according to the additional mileage secured above the guaranteed service.

This additional service amounts to from 50% to 200% above the guaranteed mileage, according to road conditions and the care with which the truck is operated.

The costs published by experienced operators of trucks show an **average** tyre cost with other tyres of 8¾ cents to 11 cents per mile.



After January 1st, in addition to the present European standard sizes, Polack Tyres of the demountable type will be supplied in sizes to fit American S. A. E. standard wheels.

Polack Tyre Company

Ehret Building, Broadway and 59th St., New York

1004 Michigan Ave., Chicago
247 Jefferson Ave., Detroit
512 Mission St., San Francisco
146 Sumner St., Boston, Mass.
505 Liberty Ave., Pittsburg
917 First Ave. So., Minneapolis
930 So. Main St., Los Angeles
516 Parkway Bldg., Philadelphia, Pa.
Benoist & Aull, Benoist Bldg, St. Louis

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Velie Motor Trucks

Service Satisfaction

THE Velie Motor Truck is not an adaptation of pleasure car construction, but a commercial vehicle intelligently designed and built on the basis of service and satisfaction to the user.

No description however complete can depict the ease of operation, the accessibility of parts and strength of materials which in the Velie truck represent years of experience and trial and all that is good in motor truck manufacture.

4½ x 5½ Heavy Duty Motor.
Sealed and Positive Governor Control.
6-in. I-Beam Frame—and Sub Frame.
4-in. Rear Axle—Timken Bearings.
Spring Cushioned Strut Rods.
Differential Lock—1¾-in. Side Chains.
18 x 3½ and 14 x 2½ Expanding Brakes.
40 x 5-in. Dual Tires—3-in. Square Spokes.
Bodies Suitable for Every Purpose.

The brief specifications as outlined above are sufficient only to direct some thought to the unusual features found in its construction and to warrant further investigation of its merit on your part before making any adverse decision in your purchase.

Velie Commercial Trucks will be exhibited in the First Regiment Armory section of the Chicago Show February 5-10

The worth of a guarantee is not only dependent upon the intent of the manufacturer and interpretation placed upon it, but upon the ability to serve as well.

Velie service is as much a part of the Velie Truck as its motor or tires. Backed by an organization of almost unlimited capital, built with the aid of a manufacturing experience extending over many years, and fostered by branches and service stations in every part of the country, its owner may be assured of consideration and attention such as is impossible to obtain elsewhere.

Heavy duty trucks of 2 and 3-ton capacity and several types of light delivery wagons comprise our line and fulfill every requirement of modern delivery service. The merchant interested in motor delivery should investigate the Velie Line before making a selection for his purpose.

Velie Motor Vehicle Co., Moline, Illinois, U. S. A.

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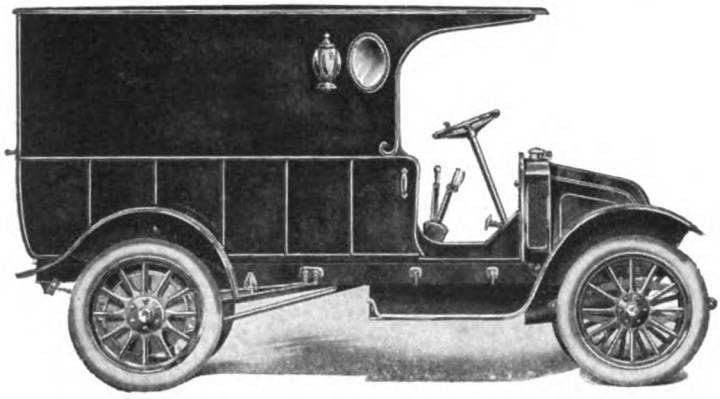
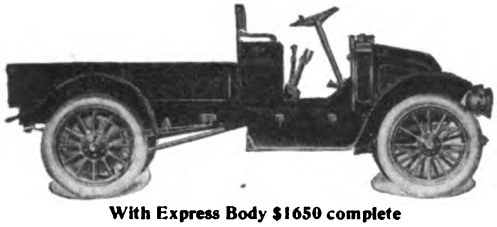


With Panel Body $1675 Complete

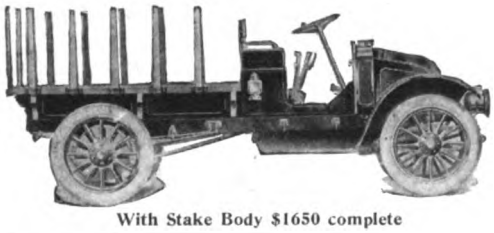
Lippard-Stewart

A full line of light delivery cars at low prices

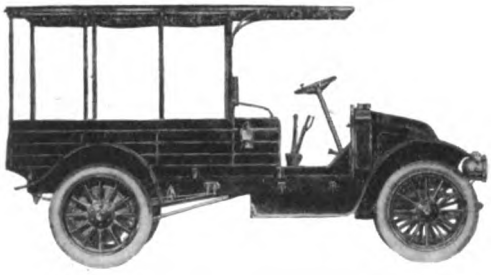
This is the Delivery Car that has Taken the East by Storm



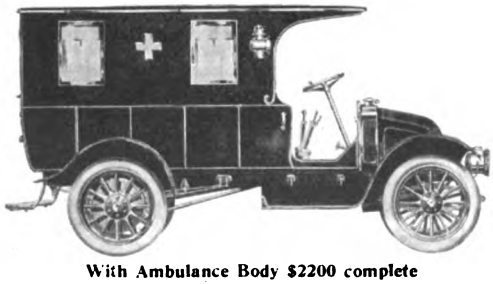
With Express Body $1650 complete



With Stake Body $1650 complete



With Express Body and Top $1650 complete



With Ambulance Body $2200 complete

With Patrol Body $2200 complete

EXHIBITED for the first time at the Grand Central Palace Show in New York, the Lippard-Stewart Delivery Car won its way immediately to the favor of eastern dealers and purchasers.

Experienced dealers were quick to recognize the sales possibilities of this delivery car—quick to appreciate its many valuable and exclusive features which appeal to the merchant as soon as he sees them.

Read what a few of these dealers say:

Sterling Place Garage & Sales Co., Brooklyn, N. Y.

"The first real delivery car placed on the market."

Newark Power Wagon Co., Newark, N. J.

"The high grade merchants will take to them like ducks to water-"

H. J. Stout & Son, Trenton, N. J.

"They have no equals—they will be easy sellers."

Ryder Motor Car Co., Poughkeepsie, N. Y.

"Just what we have been looking for. It really is a bargain for the money."

Speedwell Sales Co., Washington, D. C.,

"The pictures in your ads don't do your cars justice—your construction is correct."

Merchants who saw the cars were delighted with their beautiful lines, their sturdy, substantial construction, their simplicity and the easy accessibility of all parts.

The success of the Lippard-Stewart at the New York Show proves again if proof were needed—**that this is the car the motor world and the mercantile world have been looking for. It is indeed the first commercial car, selling at a low price, embodying all the up-to-date features.**

Few cars selling at our figures offer you **any** of the Lippard-Stewart features. No other car at any price offers you all of them.

Lippard-Stewart Features

Read this list of some of the most important advantages of the Lippard-Stewart—every one tested by experience and proved to be the best possible construction.

1. **Four Cylinder Monobloc Motor.**
2. **Selective Transmission.**
3. **Multiple Disc Clutch.**
4. **Special Timken Rear Axle.**
5. **Left Hand Steering.**
6. **Bosch Magneto Single Ignition.**
7. **Thermo Siphon Cooling.**
8. **Special Spring Suspension.**
9. **Every part accessible.**
10. **Handsome lines—beautiful finish.**

The Lippard-Stewart has a small four-cylinder motor and a low-geared (5 to 1), shaft driven axle. This combination gives it a surplus of power for all occasions with a remarkably small consumption of gasoline and oil.

This combination also gives the Lippard-Stewart the same weight moving ability as many cars with motors twice as large, having the ordinary gear ratio of touring cars.

Vibration, due to the motor, and harmful to all the mechanism, is reduced to a minimum. The Lippard-Stewart delivery car is as quiet and easy riding as the highest grade pleasure car.

Opportunity for Live Dealers

Remember the commercial car offers the biggest money making possibilities of the motor car business. Quick, easy sales. Big profit. No trading. Get into this branch of the business early and repeat, in even greater degree, the success of the pleasure car business.

Write or wire for full information and our proposition to dealers.

LIPPARD-STEWART MOTOR CAR COMPANY

BUFFALO, N. Y.

AUGUST BECKER, Pres. T. R. LIPPARD, Vice-Pres. E. J. BARCALO, Treas. R. G. STEWART, Sec. and Chief Engineer

Please mention the "Power Wagon" when writing to advertisers.

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THE POWER WAGON

No. 87. CHICAGO, ILL., FEBRUARY, 1912. No. 87.

PUBLISHED THE FIRST OF EVERY MONTH BY THE POWER WAGON PUBLISHING CO
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WALTER WARDROP - President and General Manager
HENRY FARRINGTON - - - Editor

F. F. BARNET - - - Associate Editor
H. L. HISCHE - - - Eastern Representative

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1777 Broadway
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Changes in advertising copy for the next issue to be in the office of publication not later than the 10th of the current month when proof is to be submitted, and not later than the 15th of the month when no proof is required

Entered as second-class matter December 3, 1907, at the Postoffice at Chicago, Ill., under the Act of Congress on March 3, 1879.

The Chicago Show.

The Most Remarkable Exposition in the History of the Motor Wagon Industry.

FROM FEBRUARY 5 to 10, 1912, at the Coliseum, Coliseum Annex and First Regiment Armory, Chicago, will be held the greatest power wagon show in the history of the industry to date. In number of exhibitors and exhibits, and in representative value, this wonderful exposition will prove an eye-opener even to the most wide-awake and enterprising of the middle western and western sections of the motor wagon world, while to visitors from the east it will be a positive revelation. It will be greater in representation of finished motor wagons than both the "Palace" and "Garden" New York shows combined.

* * *

To the agents looking for 1912 connections, to the thousands of potential users of motor wagons in the middle western states and in the country at large, and to the banking interests that will be represented at the Chicago show, the impression will be stupendous. Many have expressed their convictions that the power wagon is "the coming thing." The Chicago show will show in visual and unmistakable fashion that it is here with a vengeance and here to stay.

It is truly a wonderful thing that an industry which up to date is represented by less than 21,000 motor wagons in service should be able to support such an exposition as the Chicago show. It is even more wonderful when one is assured that only lack of space prevents an exhibit probably twice as large. And yet this is the simple truth. Realizing this, one is not astonished that the well informed statisticians of the industry have predicted the manufacture and sale of 25,000 motor wagons this year—nearly 5,000 more than the total number of machines already in use. And yet the preliminary buying at the New York shows, which is comparatively insignificant compared with the sales that will be consummated at the Chicago exposition, indicate that even this number is conservative and will probably be greatly exceeded before another year is upon us.

This leads to the question of how the motor wagon field is being recruited, and again we have to dispel a common illusion. It is not from the pleasure car field, but mostly from outsiders that the motor wagon industry is now being evolved. It is true that many of the

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big automobile pleasure car makers have broken into the motor wagon industry, and that others are still coming in every week. But the great bulk of the new men are from outside the motor industry. They are men with brains, money and commercial experience, who have come to the realization that the motor wagon is a thing apart from the pleasure car, both in the functions it has to perform and in the way it must be built to perform those functions. Even the dealers and salesmen of motor wagons are largely recruited from without the pleasure car industry, and it is just as well that it is so. For there is more difference between a passenger automobile and a power wagon for road transport of freight than there is between a steam railroad and a street car system.

* * *

To Samuel A. Miles, general manager of the National Association of Automobile Manufacturers, who is responsible for much of the success of these annual shows, the wonderful expansion of the motor wagon industry which is reflected in this year's exposition at Chicago must be particularly gratifying.

"Without risk of being called an unfair critic," says Mr. Miles, "I think that results at the twelfth annual show here in Chicago will be more emphatic than were those at the eastern shows. One reason for this is that Chicago has not had rival shows and the N. A. A. M. has built up the annual exposition here as one of the most democratic of all motor shows. Even when the licensed and unlicensed factions existed in the industry the national association brought Seldenite and independent together in harmony under the same roofs."

In another article in this issue there is pointed out another and better reason why the Chicago show is the most representative of its kind in the country—the center of use and of manufacture of motor wagons are both within 200 miles of the middle western metropolis. Chicago is the logical center of the power wagon industry.

ECONOMY OF MOTOR FIRE APPARATUS.

The chief of the fire department of Birmingham, Ala., has just made a comparison of the cost of maintenance and operation of the motor driven fire apparatus and the old horse drawn engines and wagons. It is true that the comparison is for a month only, but it covers 14 machines and is, therefore, suggestive.

The 14 motor vehicles answered 144 alarms, in the period mentioned, practiced 39 hours, traveled 4,765 blocks, consumed 460 gallons of gasoline and 20 gallons of lubricating oil, at a total of $63.72, an average of $4.50 for the upkeep of each machine.

The chief of the department reports that the feed alone for the horses necessary to draw the same number of machines would cost $450, and it was established that motor apparatus makes better time to fires at less risk to street traffic and to firemen than horse drawn engines, trucks and wagons, and that with increased efficiency there is a decided reduction in expense from the installation of motor apparatus. This seems to be the experience of all cities that have made the change.

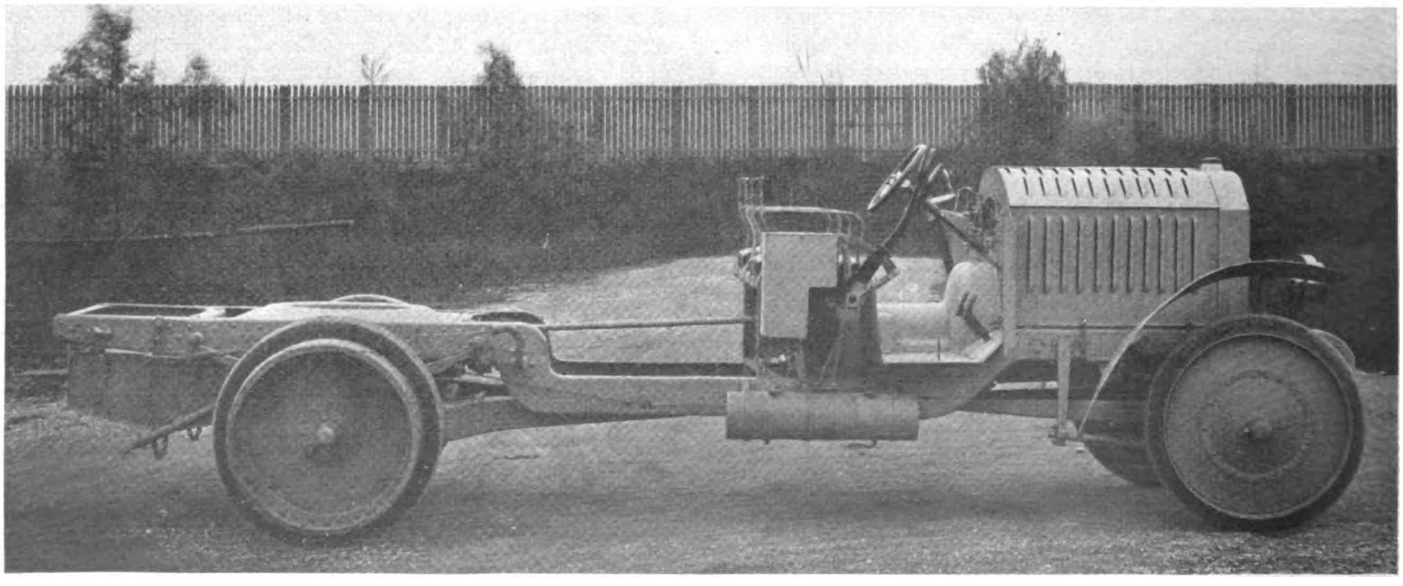
MOTOR OMNIBUSES IN LONDON.

The General Omnibus Company, of London, Eng., will by September of this year place in service 1,000 new motor buses of the most modern and improved type. This will bring the total motor bus installation of this one company up to 2,400 machines.

In the evolution of transportation in London, over 23,000 horses and 2,000 horse omnibuses have been replaced by motor vehicles during the past few years.

Not a single horse drawn police patrol remains in Denver, Colo., all such vehicles having been replaced by power wagons.

The police department of Joplin, Mo., has installed a motor patrol.



Daimler Mercedes Motor Wagon Used by the Krupp Armor Company for Carrying an Aerial Gun.

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The Cost of Living.

The Universal Introduction of Power Wagons Would Release Big Areas for Food Raising.

APART FROM its economy and utility, the motor wagon is going to cut a big figure in reducing the cost of living. How? Read the following, which is from a publication devoted to horses:

"What becomes of the $743,000,000 yearly hay crop?

"The horse eats it.

"What becomes of the $334,000,000 yearly oat crop?

"The horse eats most of it.

"What becomes of the $1,337,000,000 corn crop?

"The horse eats a large part of it."

* * *

The editor of our contemporary journal meant these statements for the farmer. But what damaging admissions they are!

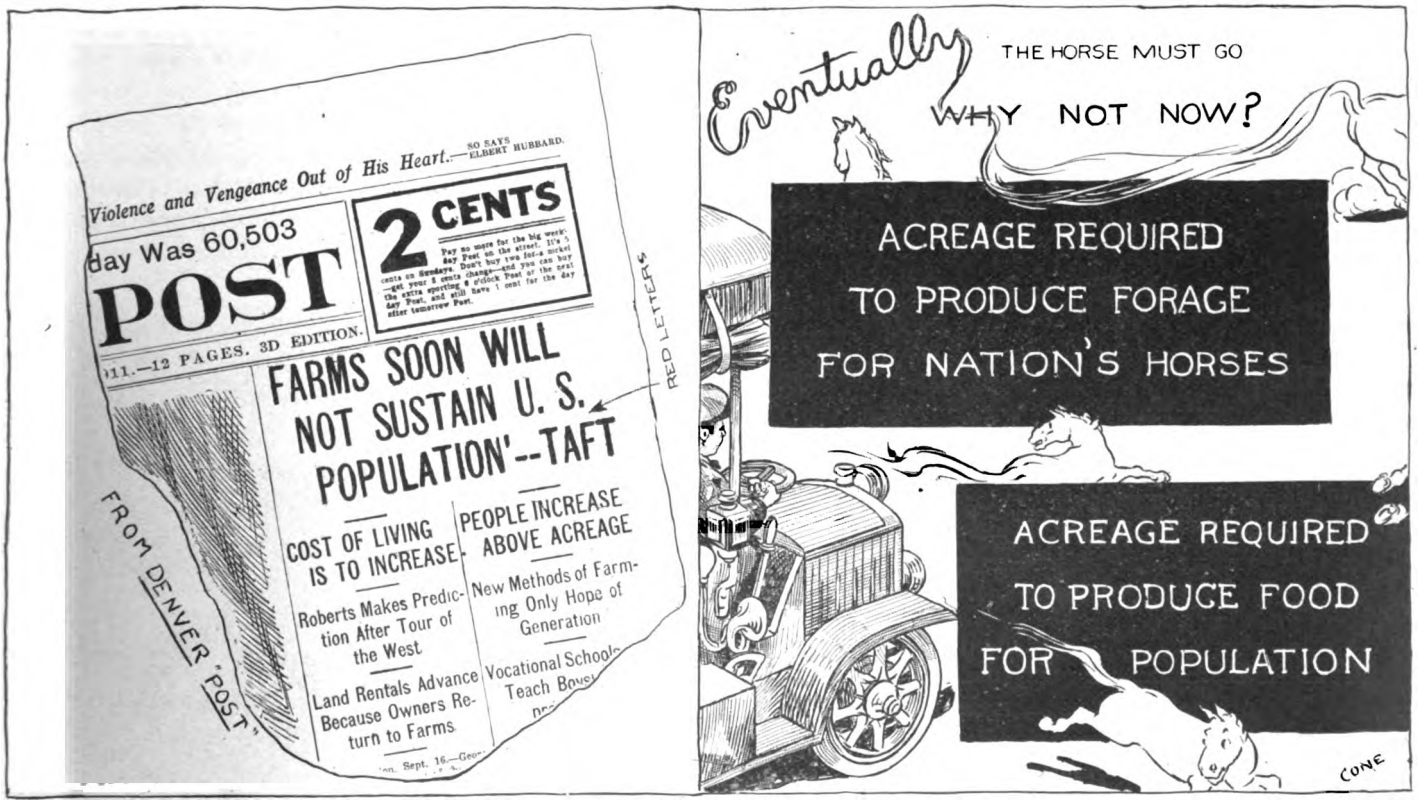
Does it really cost about two billion dollars a year to feed the horses? We don't believe it costs quite that much, but even if this stupendous figure is cut in half and then again bisected, the waste on this score alone must be simply appalling. One quarter of two billion dollars—that is, $500,000,000—would buy 250,000 power wagons of various ratings, and these would probably suffice to take care of the whole of the transportation in this country that is done at present by horses, provided the machines were worked at near their maximum capacity. For a fraction, then, of the yearly food bill for the horses, they could be replaced by motors. Think of the tremendous saving!

But the matter does not end here. Those two billion dollars' worth of farm product need a lot of land for their raising. If this land were used to produce food for man, either directly by raising vegetables or indirectly by supporting cattle, the price of food would immediately become cheaper. And even then the farmer would be the gainer. For anything that produces economy in this world improves the standard of living and the wealth of everybody. Arkwright's invention, instead of throwing a few thousands of English weavers out of work, actually paved the way to a great industry employing millions of people who are far better paid then the workmen of Arkwright's time. And so it is with every economic advance.

Our artist has seized the opportunity to display the idea pictorially. The coming of the motor wagon means the eventual retirement of the delivery horse, and with it a big reduction in the cost of living.

An ordinance to limit taxicab fares to 30 cents for the first half mile and 10 cents for each additional one-third of a mile will shortly be considered by the New York Board of Aldermen.

The German army has acquired a motor plow for digging military trenches. The machine can operate at six miles an hour, it is said, and requires only one operator.


Violence and Vengeance Out of His Heart.—SO SAYS ELBERT HUBBARD.
day Was 60,503
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2 CENTS
911.—12 PAGES. 3D EDITION.
FARMS SOON WILL NOT SUSTAIN U. S. POPULATION'--TAFT
RED LETTERS
FROM DENVER POST
COST OF LIVING IS TO INCREASE
PEOPLE INCREASE ABOVE ACREAGE
Roberts Makes Prediction After Tour of the West
New Methods of Farming Only Hope of Generation
Land Rentals Advance Because Owners Return to Farms
Vocational Schools Teach Boys
Eventually
THE HORSE MUST GO
WHY NOT NOW?
ACREAGE REQUIRED TO PRODUCE FORAGE FOR NATION'S HORSES
ACREAGE REQUIRED TO PRODUCE FOOD FOR POPULATION
CONE

That the more general use of the motor wagon in place of the horse will reduce the cost of living, besides the cost of transportation, is clearly shown in these pictures. The newspaper clipping is from the Denver "Post" of September 15, 1911.

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Army Motor Wagon.

An Earnest of Uncle Sam's Endeavors to Modernize His Army Transport Facilities.

Sampson Army Motor Wagon in Field Service.

THE LATEST type of army field wagon, built by the Alden Sampson Manufacturing Company, a division of the United States Motor Company, has been delivered to the Quartermaster's Department of the United States Army and placed under a severe test in Texas to determine the efficiency of motor wagons for field service such as the carrying of supplies, and troops when necessary, across country.

That the War Department recognizes the national defense as a problem of transportation quite as much as one of fire arms, is indicated by the interest which army officers and others in Washington have taken in power wagons since reliability became a strong feature of the modern automobile. There has been much speculation as to what will eventually happen to the army mule, and gossip of army circles has had it that Uncle Sam would soon be in the market for a great many motor cars.

Whatever foundation there may have been for this report, nothing of an official nature has been done toward wholesale buying or ordering and the activity of the Quartermaster's Department, so far as officials have been willing to admit, has been limited to two contracts for the construction of motor field wagons. One of these contracts was placed with the Alden Sampson Manufacturing Company and the truck which this company built under special requirements and specifications of the Quartermaster's Department, is the one that has just been sent to the Mexican border.

* * *

From the standpoint of army practice in field equipment, this machine is not unusual although its features are interesting in that they differ from what is standard practice now with the builders of commercial power wagons. For example, the wheels of the Sampson field wagon are 42 inches in diameter both front and rear, this size being necessary to give the clearance which is required by the army in cross-country work.

Fording streams, traveling through great open fields, and running over stones, sticks and stubble have long been a part of the routine of the mule and the government has made certain that his motor successor shall be equipped to do likewise when it becomes necessary. In order to pull the machine out of mud holes or other tight places where traction is lost, the wheels are built so that winch-heads can be attached to them by means of simple hook bolts.

With a rope attached to some fixed object and two or three turns taken around the winch-heads, the slipping of the wheels will wind the rope on the winch head and pull the motor wagon out of the hole. The double side chains which furnish the final drive are inclosed in sheet metal cases to keep out mud and grit and at the same time to act as distance and brake torque rods.

* * *

The seat is built over the engine in the manner characteristic of the standard 3,000 pound Sampson. The inside body dimensions are 108 inches long by 43 wide. The body is equipped with flare boards on the sides and a tail gate which runs up to the same height as the side boards. These are heavily reinforced with iron and chained. Conforming with army practice, the body is fitted with removable bows and a canvas covering.

What is equally interesting is the attitude of the army toward speed, as expressed by the specifications of this machine. Nine miles an hour is the very highest speed that it will make. The normal engine speed is governor controlled to 1,000 revolutions per minute. A very low gearing has been adopted in the machine.

Another feature which suggests that a wide range of service is anticipated by the army officials is the specification of a 60 inch tread which allows the wheels to "track" in the very wide ruts of southern roads. This

Latest Type of U. S. Army Motor Wagon, Built by Alden Sampson Co. and Now Under Trial in Texas.

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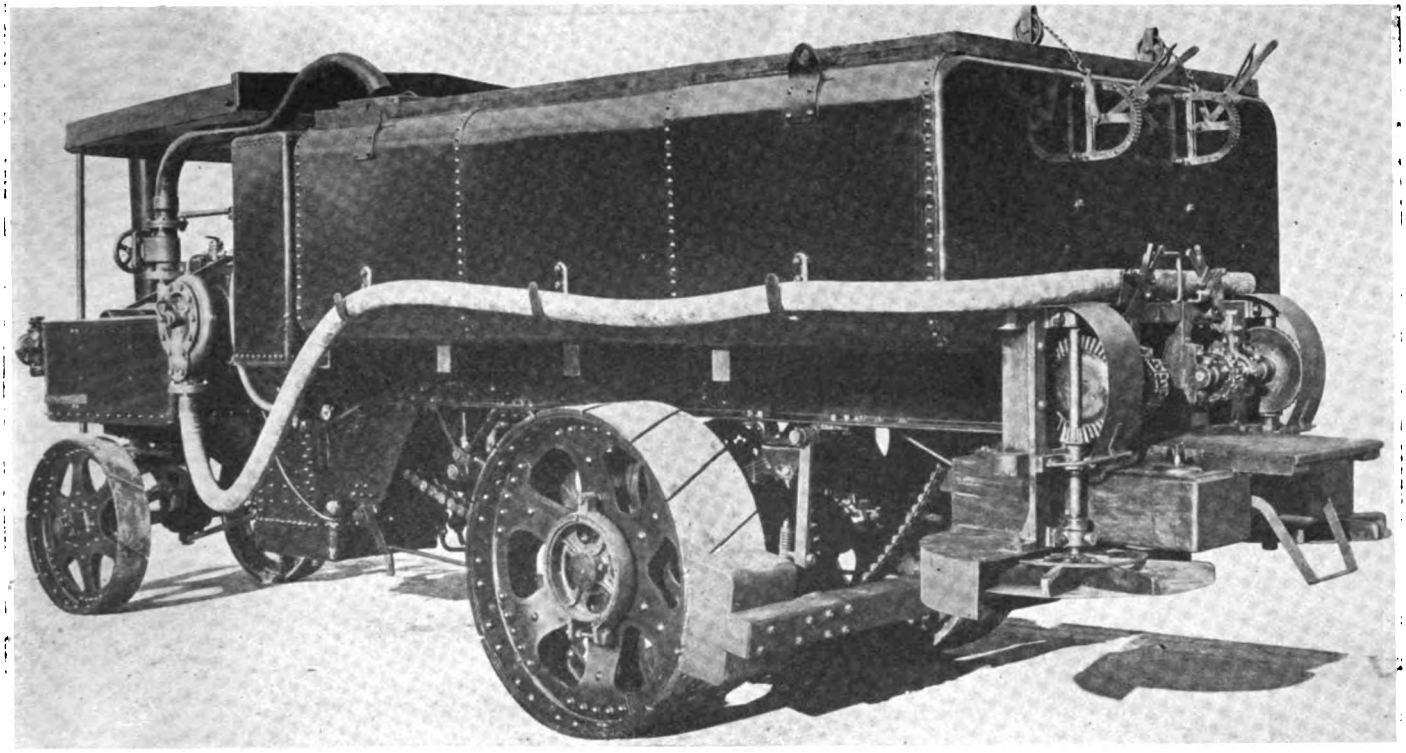

Steam Wagon Used for Watering Roads in India.

has been the tread of all horse drawn field equipment. The wheel base is 110 inches, and the wagon is designed to carry a load of from 2,500 to 3,000 pounds.

In many respects the features of the wagon are as strongly characteristic of motor wagon practice as other features are characteristic of army practice. The engine is of the 4 cylinder type, having a bore and stroke of 4 and 5 inches respectively. It is mounted in a pressed steel frame 4½ inches deep, the flanges being tapered from 4 inches wide in the center to 2 inches at the ends. The front axle is a standard forged I-beam section steel axle while the rear is 2½ inches square with hubs having roller bearings. Multiple disk clutch, three speed transmission, and double set of brakes, both expanding internally and partially self-wrapping in either direction, are features not foreign to present tendency in motor wagon design.

MOTOR WAGON IN "36 BELOW" WEATHER.

In snow 3 feet deep, and with the thermometer registering 36 degrees below zero, the motor bus owned by Frank Bay, of Chisholm, Minn., and operating between that town and Hibbing, has continued making its three round trips of 11 miles each every day without any apparent difficulty.

Since Mr. Bay bought his machine, which is a 2 ton Avery with a bus body, he has averaged $24 a day, or $4,750 in less than 8 months. He has lost but 1½ days during that time on account of repairs.

Single deck motor buses are being operated in New York in the winter months, instead of the double deck buses previously used.

STEAM WATER WAGON.

The impressive-looking machine shown in the picture is one of two steam operated water wagons imported by the government of India to water the roads during the recent Durbar at Delhi, when George V of England was crowned Emperor of India.

They are fitted with special rotary pattern sprinklers because, owing to the condition of the Indian roads, the engine must travel down the center and yet must sprinkle a full 60 feet in width. The tanks each hold 1,000 gallons, and at the back are two downtakes which deliver the water on to a pair of horizontal paddle wheels. As these revolve at about 1,000 revolutions per minute, the water is broken up into a fine spray and thrown backwards and sideways. The amount of water can be regulated, and enough can be thrown to saturate completely any ordinary road.

For filling purposes a centrifugal pump is fitted, which is driven from the engine.

The motor portion comprises a compound horizontal steam engine mounted on top of a locomotive boiler fired from the side. The drive from the crankshaft to the intermediate shaft is by spur gearing, and then by a roller pitch chain to the main axle.

This motor water wagon was designed and built by Mann's Patent Steam Cart & Wagon Co., Ltd., of Hunslet, England.

Mail congestion in Stockton, Cal., was relieved at Christmas by transporting all first class matter in motor wagons loaned by local owners.

Hahnemann Hospital, of Rochester, N. Y., has a new motor ambulance.

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A Little Knowledge.

Newspaper Criticism Is Valuable, but Only When It Is Conservative and Rational.

IT DOES NOT require any appreciable effort of the memory of the "oldest inhabitant" to recollect when this or that popular newspaper began to devote a special section every day to the subject of motor wagons. And on the principle that "every little bit helps" there is not the slightest doubt that the sum total of this form of publicity is in the main helpful to the industry. But motor wagon specialists and writers, like the ancient city that was built on the Seven Hills, are not made in a day, and it is not to be wondered at that some ridiculous mistakes occasionally find their way into print, the errors of too ambitious "automobile editors" whose "reasoning" would prove fallacious if they could devote a little time to simple research and observation.

* * *

This is a sample of the kind of writing we have in mind: "In the present stage of development in congested traffic districts the employment of power wagons is as a rule not profitable, because they are constantly held back by the slow moving horse drawn wagons and it is impossible to get out of them their capacity for economic performance, but as they are adopted in greater numbers, the era of the horse drawn vehicle will wane."

* * *

Without attempting to analyze the quaintness of the latter part of this gem of "thought," we unhesitatingly condemn the whole as a meticulous half-truth which is more mischievous in its possible effect than a downright fabrication.

* * *

The presumption of the newspaper writer is that motor wagons are limited to the speed of horse-drawn vehicles in congested city traffic. But this is very far from being the truth. Suppose, for example, a power wagon is behind a certain horse team in the middle of a line of vehicles held up by a traffic policeman at a street crossing. The officer blows his whistle and the procession starts up for the next "control," as the automobilist would call it. What happens? While the horse drivers are struggling with their teams to make a start, the alert motor wagon driver has thrown in his clutch, steered deftly to one side, and gained a few places in the procession of vehicles. He does the same thing wherever possible, and, in passing through such an area as the Chicago "loop district," he will soon gain several complete city blocks on his ancient rival, the horse.

* * *

Not content with theorizing on this possibility we actually tested it out a few days ago. The motor wagon was a 7,000 pound model which had a maximum speed of about 12 miles an hour. The other was a two horse wagon carrying less than half as much load as the machine. In nine blocks, on Madison street, the motor gained four full blocks on the horse truck, and the horse vehicle took 23 minutes to travel through the four blocks. We did not follow the motor wagon further, but it was probably four or five miles away in that time.

* * *

The deduction is obvious. The motor wagon truly was not giving its most "economic performance," but any machine that can gain four blocks in nine on a horse vehicle in the congested traffic of a city, and then get four or five miles away before the horse can come through the crowded area, surely is giving a vastly more economic performance than the horse, and that is all that anyone requires.

MOTOR EXPRESS IN SPRINGFIELD, MASS.

The Sauers Express, of Springfield, Mass., is making daily deliveries by motor wagons within a radius of 50 miles from that city. The time made is much better than that of the local express companies which utilize the steam railroads.

WILSON LINE USES ELECTRICS.

The Wilson Line, of Wilmington, Del., is obtaining splendid service from five electric wagons installed a few weeks ago. The company has installed a new garage with an up-to-date battery charging plant. Current is generated at 2,200 volts and stepped down to 110 volts for use at the six charging panels. The company uses two gasoline motor wagons for suburban deliveries.

LONDON MOTOR BUS STATISTICS.

On September 30, 1911, the London General Omnibus Company had 1,366 motor omnibuses in operation. The yearly gasoline consumption amounts to 6,841,270 British gallons. The number of employes was 10,776, and the yearly wage bill $4,134,000.

MOTORCYCLE PARCEL DELIVERY.

A motorcycle parcel delivery has been inaugurated in Waterloo, Ia. The rate for city deliveries is 10 cents per package, and 15 cents to the suburbs.

CHICAGO FIRE DEPARTMENT.

Chicago has appropriated $53,838 motor squad trucks for the fire department. This has been indorsed both by the mayor and the city council.

New York taxicab concerns are talking about establishing a flat rate of 25 cents a mile for motor cab fares, with lower proportionate prices for greater distances.

Charleston, S. C., may shortly install tractors in its fire department.

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Who Are the Buyers?

A Pertinent Inquiry Discussed, in View of Some Mistaken Inferences from Show Statistics.

WHO BUYS motor wagons? What class of transportation is most economically served by the machines? What trade groups are known or suspected to be the most eager to adopt mechanical road haulage?

In seeking answers to these questions, the natural ardor of a great many manufacturers has tempted them to indulge in the most fantastic speculation. Writing safely and sanely to this point it is not discernible that any particular class of tradesmen has shown an especial fondness for the motor wagon unless one should pause to reflect that the brewers have absorbed about $1,500,000 worth of electrics and dry-goods merchants, by massing installation, have done as much or more for machines of like and opposite type.

* * *

Casual Inquirers More Obtrusive Than Real Buyers.

In speculating upon the extent and character of the market for motor wagons, many commit the error of mistaking the shadow for the substance, and of construing casual inquiry for enlightenment concerning the machine's economy to mean a profound interest in its application and purchase. Curiosity impels many people to act in the manner characteristic of a genuine purchaser. They write letters, secure demonstrations, discuss engineering, often talk prices, but hesitate at clinching the bargain. The real buyer of motor wagons may or may not go through all these motions, but he is in the main not nearly so obtrusive as his counterfeit. It is for this reason that in a list recently published of the inquiries at the national motor wagon shows of 1911, the attendant purchasing power of brewing, packing, baking, and other trade interests makes an inconspicuous showing, while builders, contractors, grocers and printers seem to be the mainstay of the industry.

* * *

Economy of Power Wagons Often Not the Deciding Factor.

The record of daily sales in the past and in the present, however, shows conclusively that the inclination to purchase motor wagons does not depend upon any false assumption, but upon the need of the various trades for superior transportation facilities without regard oftentimes to the economy of the machine. Indeed, if economy alone were the test of worth in a motor wagon, it would be difficult to explain why many thousands of establishments throughout the country which are compelled to live out of transportation have not during the past three or four years changed their horse equipment for motors. Instead of this it remains the notorious fact that hundreds of these concerns are not only unwilling to be persuaded of the economy of the motor wagon, but are even accounted its most persistent enemies through their lack of comprehension of its qualities.

The Fear of Disturbing Fixed Investment Is Often a Bar.

Let us take for example the attitude of mind of a relatively big express company in a city of Chicago's magnitude. The writer calls to mind that in the course of a recent personal investigation it was discovered that such a company had, for a number of years, been doing a business of approximately $100,000 with a net profit of $5,000 per annum. This concern, accustomed to the limitations of horse service, both physically and mechanically, was traditionally opposed to the introduction of the power wagon, fearing that in its hands the machine would cause its trifling yearly profit to disappear should the company be unable to administer machines as competently as it was doing with its draft animal equipment.

This is not the exceptional condition. Indeed it might be regarded as the common one, and combined with the natural hesitancy of all business men to disturb fixed investment, however insecure so far as the future is concerned, is mainly responsible for the failure of machine transportation to achieve a quick and universal success.

* * *

Competitive Influence So Far Most Important Incentive.

Happily, however, the industry is now well advanced in a period of development which is as singular as it is interesting. The competitive influence of motor wagons applied in commerce in the numbers in which they are now found is at the moment an asset of particular value to the industry. In many branches of business it is no longer a question of whether Smith or Brown will consider the purchase and application of a machine, but whether he will emulate the example of his competitor and install machines to provide his customers with delivery of merchandise as expeditious as that of his rival. This in a few words is the history of the development of the motor wagon in the dry goods trade of many a large city, although it must be admitted that before this condition could have been brought about, somebody had definitely satisfied himself that the economy of the machine was as it is reputed to be.

NOVEL USE FOR POWER WAGONS.

A new use for motor wagons has been found by a poultry dealer who uses three machines for bringing in live poultry from the surrounding country to the city markets. He claims that when the poultry is shipped in by rail there is quite a large percentage of shrinkage due to fowls dying and losing weight from long confinement, while by employing motor wagons the poultry is brought in quickly, with practically no shrinkage.

Three combination mail and passenger motor wagons have been ordered by a stage line operator in Western Oregon.

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The Heart of the Industry.

Interesting Calculation Shows Chicago to Be Near the Centers of Use and Manufacture.

PROOF OF THE "Power Wagon's" assertion that the great bulk of motor wagons in this country is being applied in the middle western and western states has recently been made after a careful calculation.

The "center of use" of the motor wagon in the United States is in the extreme west of the state of Ohio, about 15 miles from the Indiana border, 170 miles east-southeast of Chicago, and 80 miles southwest of Toledo, Ohio.

The "center of manufacture" of the motor wagon industry (as represented by exhibitors at the Chicago Automobile Show this month) is only 88 miles away from the "center of use." In location it is about 200 miles due east of Chicago, 20 miles almost due north of Toledo, Ohio, and 40 miles south-southwest of Detroit.

* * *

The results of this calculation will possibly be surprising to certain "statisticians" in the East who have deluded some of the newspapers into printing such statements as the following: "There are 8,000 motor wagons in New York state, of which 4,000 are in use in New York city alone."

* * *

This is utterly false. If a motor cab or a motor bus is called a motor wagon, then it would be approximately true. But if all motor driven vehicles except those used for carrying freight and merchandise be excluded, the 8,000 dwindles down to about 3,500, as the "Power Wagon" can show from its card records. This still leaves 17,000 motor wagons for the rest of the country, and their distribution is such as to bring the "center of use" for the whole country—New York City included—just about 550 miles due west of the eastern metropolis.

* * *

About ten years ago the "center of use" was quite close to Manhattan Island. Since that time it has been traveling westward, slowly at first, but very rapidly these last two or three years. It is now only 170 miles from Chicago—as the crow flies. This time next year it is due to advance to within hailing distance of the middle western metropolis—and it will never go very far away from Chicago. The same also is very nearly true of the "center of manufacture," which is due for many years yet to remain somewhere between Detroit and Chicago.

Thus, it may truly be said that Chicago is the heart of the motor wagon industry, from both the manufacturers' and the users' standpoints.

* * *

This is as it should be. Chicago is the most wonderful city of the world. Its energy is proverbial, its rate of growth phenomenal. It is already the greatest railroad and distributing center in the world. In a very few years it will outstrip even London in size. There are more motor wagon factories in Chicago than in any city in the country, Detroit alone excepted. It is not in the order of things that Detroit will hold the lead for long. Chicago's position, geographically and strategically, is superior to that of any other city in the country. The great Middle West looks to Chicago for supplies and manufactures. And Chicago, aided by the adjacent cities, will soon supply all wants without other aid from the East than business competition usually supplies.

* * *

The motor wagon makers of the country clearly acknowledged Chicago's supremacy as a distributing and business center when they so freely lent their support to the great exposition which will be in full swing at the Coliseum and the First Regiment Armory in Chicago when this issue reaches its furthermost subscribers in this country. The Chicago motor wagon show in magnitude is greater than both the "Palace" and "Garden" shows (recently held in New York) combined. The business importance of the Chicago show is comparable with that of all the other automobile shows in the country combined—for Chicago is the Heart of the Motor Wagon Industry.

MOTOR BUSES FOR FORT DODGE, IA.

A company has been formed in Fort Dodge, Ia., with a capital of $50,000, to operate motor buses and later to do also a general motor hauling and delivery business. Four motor buses will be installed shortly.

MOTOR WAGON FOR ICE HAULING.

The Mutual Ice and Cold Storage Company, of Topeka, Kan., is using a 3 ton motor wagon for hauling ice to its inland storage house two miles distant from the source of supply. It makes nine round trips of four miles each daily, hauling 8,100 pounds on each trip. A team of horses makes four trips, hauling 6,000 pounds at each trip. The machine hauls a total of 72,900 pounds each day, while the team hauls 24,000 pounds. The motor wagon is easily doing the work of three teams. The three teams cost $13.50 per day, while the machine is run for $4.50.

At other seasons this company uses its machine, hauling 7,500 pounds of ice and pulling a trailer loaded with three tons, for supplying route wagons.

Government tests in Kansas City, Kas., show that the saving in cost of collecting and distributing mail by motor wagons over other methods would pay for a complete motor installation in one year.

Guatemala has ordered three motor wagons from an American manufacturer. They will be equipped with machine guns and wireless apparatus.

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Motor Wagon Speeds.

The Speed of a Motor Wagon Is an Important Factor in Determining Its Life.

By CLARENCE M. RODGERS

THE YEAR 1912 will undoubtedly witness a big expansion in the power wagon business. There is every indication that the elements necessary to that end are present. In view of this, it is well to consider the question of the service that motor wagons should give, and especially the speeds at which they should be operated to obtain the maximum of work at the minimum of cost.

Too many users are demanding higher speeds than are consistent with long life of machines, or even with proper freedom from stoppage of service due to derangement or breakage of parts. Some argue for the increased efficiency of service with high speeds, but it is average efficiency that is most important. The limitations of present design, successful though it is, and the deficiencies of the average street pavements, should dictate a commonsense attitude on this subject. The man who runs his machines at high speeds invariably pays exorbitantly for the service he gets from them. Repairs are necessary with seemingly inconsistent frequency, the dangers to pedestrians and to property are made manifest in accidents, and the stoppage of his service probably leads him to brand motor wagons as experimental for the practical business man—meaning himself, of course. Happily, the question of safe speed is becoming more commonly known, and one meets frequently with refreshing examples of this.

Although the finest materials of construction are used in the manufacture of motor wagons, the one feature making for comparatively quick deterioration from overspeeding is the inability of any material to withstand excessive shock and vibration. A motor wagon part generally fails from shock rather than from wear, strictly speaking. A motor-driven business vehicle has of necessity to go over all kinds of streets—it has to take them as they come, good and bad alike. The chief safeguards from shock are the springs and tires. Springs have but a limited range of action at best, and are generally too stiff when the vehicle is running light or without load. This is the time a machine is liable to sustain more injury than when loaded to capacity, for all parts will receive a bigger proportion of the shocks from the wheels. That many do not realize this has been clearly shown in the writer's experience, when prospective buyers have demanded a higher rate of speed "coming home." It is well to remember that in daily service we cannot run our motor wagons over boulevard-like roads to any extent; also, that the average driver is quite apt to "speed her up" towards quitting time.

Rubber tires are a large factor in lessening the effects of road shocks. The service they give in this direction on motor vehicles running over five miles an hour fully justifies their cost. Tire upkeep is generally the second largest item in the expense of machine service, labor coming first. The wear and tear on tires increase in much greater proportion than the increase of speed; this has been proved in many cases.

Some makers equip their motor wagons with pneumatic tires with the sole object of minimizing the effects of shock, but this is not practical today in any but the smaller sizes of machines—say, of 1½ tons capacity at the very outside. There are in the business many good companies which advocate this and there are others apparently as correct in design values which believe that the most practical solution of the overspeeding problem is in the use of some device which will prevent running at a greater rate than a predetermined safe speed.

Many machines have only the limit of speed imposed by their gearing. This was universal in the early stages of the industry, as high speed engines were the approved type. That this is not economical in fuel consumption—when the limit of speed is fixed by "gearing down"—is obvious; neither is it conducive to long life.

That some sort of automatic speed governing device is necessary in the majority of power wagons is conceded by those of broad experience in the motor vehicle field, and average records of quantity and cost of work done by trucks, with and without speed governing devices, will show this to be correct. The way adopted by some makers to limit the speed is by governing the engine speed through an auxiliary throttle connected to a centrifugal governor. This has worked out well, and the extra mechanism for this purpose has long life and needs very little care.

Many owners and makers advocate governing the vehicle speed independently of the engine speed, although they are rather hazy as to the details, one man summing up the question for all by pointing to the rear wheels of the chassis then being looked over, and stating: "There is the proper place for a governor, for you want all the speed of the engine to get out of mud or sand.

"Engine speed means engine power, and the faster you can run the engine the more power you can get to use in an emergency."

If this man wanted to take advantage of the momentum of moving parts, such as the flywheel, for a short interval of time or distance, he would gain his object. As the point desired in motor wagon engines is continuous pulling, the problem resolves itself into a question of engine torque—"plugging"—and as the point of greatest torque in up-to-date engines is obtained somewhat below the speed at which they are ordinarily governed, it would seem folly to court quicker wearing out of moving parts for the only benefit (?) to be derived from not governing the engine—the ability to

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"rush" a bad spot in the road, with consequent excessive strains on all the driving mechanism.

Without a governor, an engine is too liable to the very bad practice of being raced "idle." The lubrication of an engine is a most vital point; there is economy and reasonable certainty of good oiling at moderate speeds, lessening as the speed increases. Up to and including the 1½ ton size, a motor wagon should perform creditably at a speed limit of 15 miles an hour unless for some special service as in fire department work; higher capacities should have less speed. Most cities limit the speed to 15 miles—why then place it within the ability of the driver to go faster? Even in fire and police department service the tendency is toward slower speed than formerly.

Power wagon makers are not afraid that their product will not stand up with legitimate use; what they want to avoid is the abuse. Both buyer and seller are interested in the same manner in a motor wagon; the amount of work done and the total cost of that work. Overloading has been considered about the worst abuse that could happen, but overspeeding is a much greater evil in the writer's opinion. Then there is the tendency of side slip and skidding, which increases with the speed of a motor wagon, especially if solid tires are used, and at times this results in much damage. The question of braking is important and has a direct relation to the speed.

All of which goes to show that increase in truck speed over a normal, safe rate involves increase in upkeep costs out of all proportion to the additional work done.

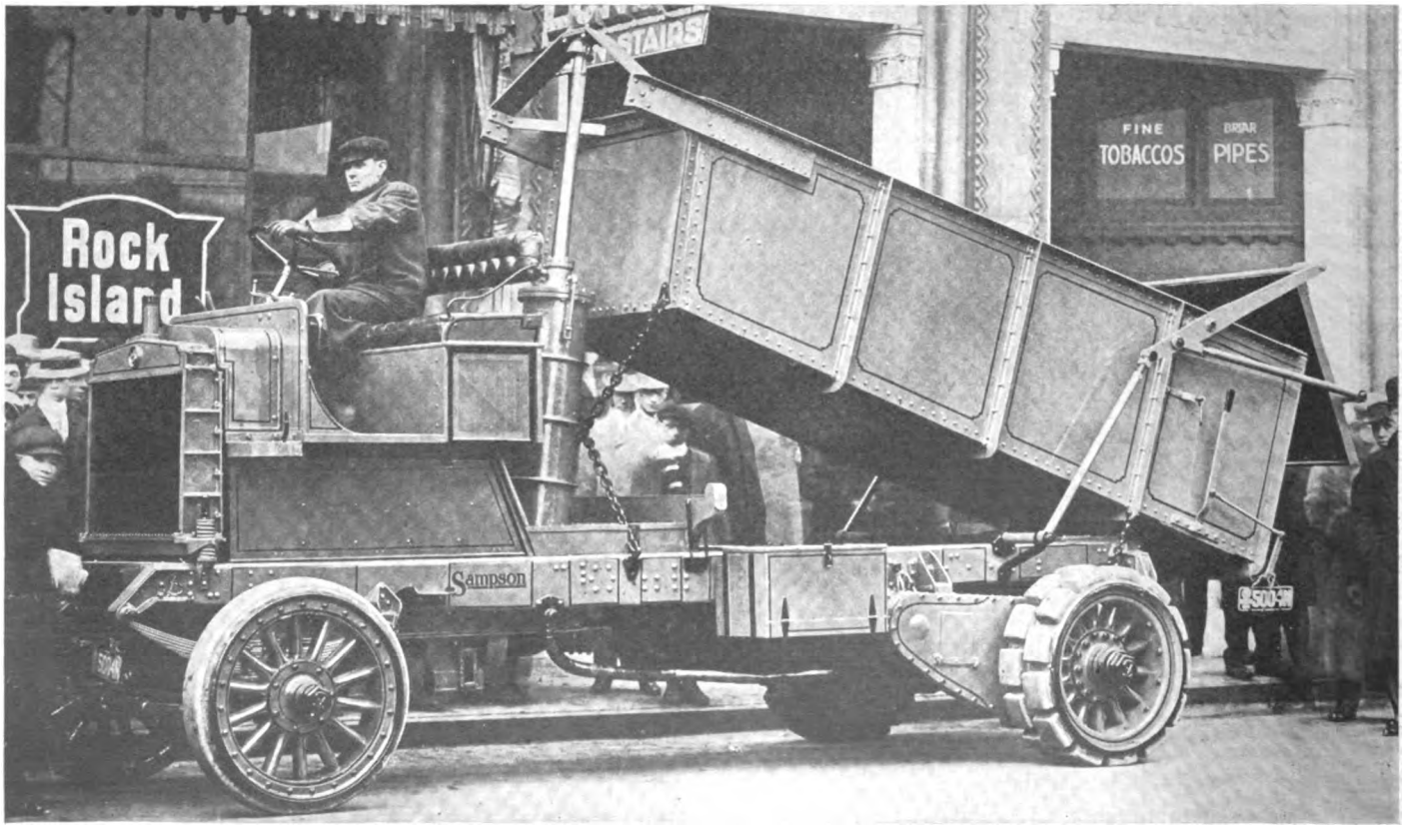
NEW MOTOR DUMPING WAGON.

SIMPLICITY, freedom from vibration, silence in operation, and absence from shock and jar—these, combined with ample power under any and all circumstances, are the principal and commendable features of a new dumping device for motor wagons which has just been placed on the market by the Alden Sampson Manufacturing Company after a series of exhaustive tests which amply convinced the engineers of this concern of its complete practicability for the purpose intended.

Geared to the power plant is an air compressor of ample capacity which, when brought into action, stores air in a tank suspended beneath the frame. The valve for passing air from the tank to the cylinder which raises the double body, is controlled by a short lever on the dash. Its action is substantially the same as that of the air brakes employed on electric trains. The lever is really a key which the driver places in his pocket when he leaves his seat.

Another feature of the body is also automatic and aids in the reduction of time consumed in dumping the load. As the forepart of the body begins to rise, the tail board or gate is automatically raised so that it is almost free from contact with the down-rushing load. This arrangement, with the simplicity and speed of the air compression, enables one person to stop, dump the load and get away in two to three minutes.

Power wagons will be used in Chicago to transport historical exhibits from the Field Museum to various schools.



Sampson 5 Ton Motor Wagon With Dumping Body Operated by Compressed Air.

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IN THE WILDS
THE WIDE, WIDE WORLD FOR US. LET'S GET A JOB IN THE BUSY HAUNTS OF MEN
ON THE BOULEVARD
LOOKS BAD FOR WORK HERE!
IN THE CITY
THIS IS NO PLACE FOR US!!! OUT TO THE FARMS
ON THE FARM
CURSES!! IN WRONG AGAIN!
NOTICE!
NO RACING IN CALIFORNIA
GOV. OF N.Y. PUTS BAN ON RACES
JUAREZ TRACK CLOSED
RACE TRACK
TICKETS
STUNG AGAIN!!
AT THE TRACK
"GOOD NIGHT"
CONE

Signs Already Are Not Wanting That the Horse Will Soon Be Out of Place, Not Only in the City, But Also on the Farm—and This Will Come to Pass Sooner Than Most of Us Even Suspect. The Artist Has Depicted the Fanciful Wanderings of the Equine Alice in Wonderland, Ten Years Hence.

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It Hits the Pocket Book.

The Power Wagon Is the Only Sure Cure—Any Other Remedies Are Only Palliative.

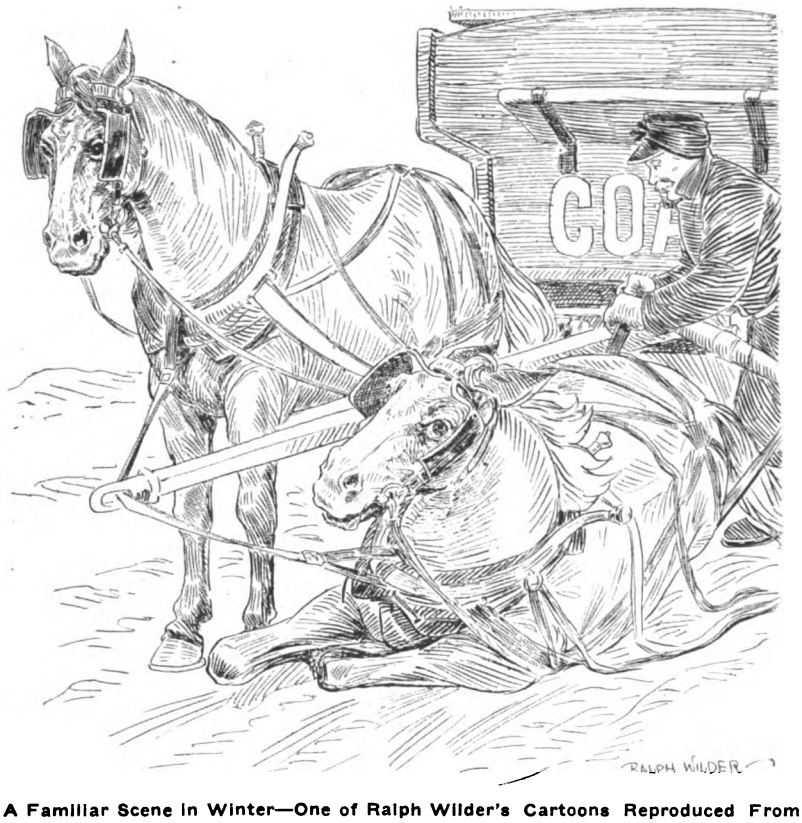
"FORTY HORSES killed daily (in Chicago). Icy pavements fatal to many draft animals. One thousand slip down each day. Some deaths could be prevented by using blankets."

These were the heads used over a pertinent item which appeared in the Chicago "Tribune" of January 11 last. The article reads as follows:

"According to the checking list of George A. H. Scott, superintendent of the Illinois Humane Society, 1,000 horses fall on the icy streets daily in this zero weather, and 4 per cent, or 40 horses, die in consequence every day.

"Reports have been received of falls in all sections of the city, particularly at Quincy and Market streets, at the Harrison, Kinzie and Rush street bridges.

"'There are not enough ambulances to care for the horses that fall until several hours after the reports are received, and as a result many suffer and die from cold. If citizens would cover a horse or put a blanket under him until help arrives from the Humane Society, many horses could be saved,' said Superintendent Scott."



A Familiar Scene in Winter—One of Ralph Wilder's Cartoons Reproduced From the Chicago "Record-Herald."

The illustration on this page is reprinted, by courteous permission of the editor, from the Chicago "Record-Herald." It is one of Ralph Wilder's famous cartoons, which are accomplishing more real good in the city of Chicago than could be done by many columns of bellicose editorials such as seem to be considered necessary by some of the more sensational newspapers.

Wilder puts as the type head over his picture: "Another Plea for New Shoes and Sand." He evidently thought only of the easiest, cheapest and most opportune method of remedying a crying evil. But these are only palliative remedies; they alleviate to a certain extent, but they do not cure. The only sure panacea is the motor wagon.

Forty deaths a day from falls on the ice in winter—that is a tax of $8,000 a day, for being old fashioned. A similar toll in "100 in the shade" weather in summer! Merchants cannot stand long for such unnecessary burdens on their pocket books. That is where it hits most—in the pocket book. Let us leave humane considerations out of the question—most of us do when it comes to a matter of dollars and cents—and consider only the economic aspect. Horses are unreliable just when they are wanted most—in extremes of weather. If a man fails to "make good" in a business organization he is discharged, unless he has a pull. Surely the only "pull" the horse has is on the side of sentiment and long association. In no other way has he any advantage over the machine.

There is no need to point the moral.

A FINE FEAT.

Splendid economy and a big return on the investment are being obtained from a 4-ton Speedwell motor wagon which, by reason of its wonderful performance, has aptly been named the "Interstate Express."

This machine makes a regular daily trip of 97 miles under full load between Salem, Mass., and Portsmouth, N. H., going one day and returning the next. Its "load efficiency," if one may coin a term, is thus 100 per cent, for the machine when running is always loaded to capacity. Such a performance over rough country roads is a remarkable tribute to the modern power wagon, and is a feat that could not be duplicated with a horse-drawn vehicle unless about 30 animals were to be operated in suitable relays.

The fire commissioners of Richmond, Va., report that the cost of maintenance of the motor fire engine is 75 per cent less than that of the steam engine.

A combination motor police patrol and ambulance has been placed in service by the city of Holyoke, Mass.

The Kansas University Hospital, of Rosedale, near Kansas City, Kas., has installed a motor ambulance.

Cheltenham, near Philadelphia, has installed a combination motor patrol and ambulance.

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The Chicago Show.

List of Exhibitors and Their Models. Details of Design of These and Other Machines Are Fully Given in the Specification Tables in This Issue.

Adams Bros. Co., Findlay, Ohio.

This concern makes a one-ton motor wagon, which it guarantees against defective workmanship and material for one year. Accessibility of all working parts is a prominent feature.

Details of design are fully given in the specification tables in this issue.

* * *

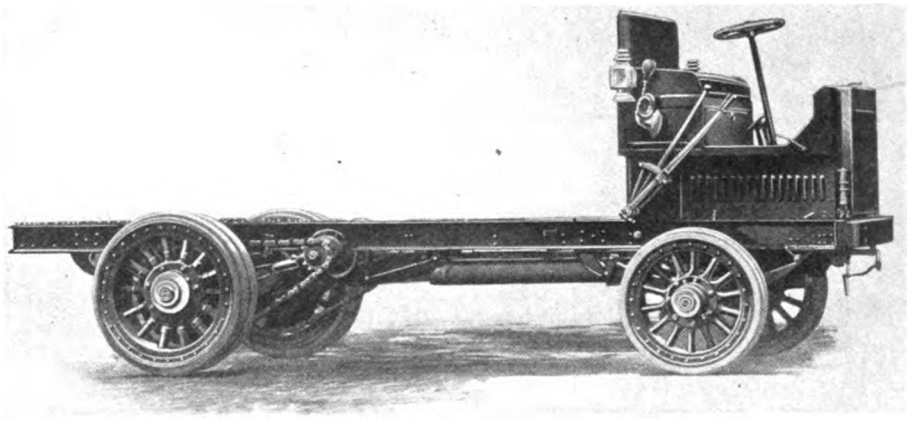
American Locomotive Company, New York.

This concern makes the "Alco" gasoline wagons, of the following load ratings: 2, 3½, 5 and 6½ tons. The motor in these machines is quickly accessible by removing either of two long plates at the side. It is fitted with a decompresser, which requires a minimum of compression for starting. The lubrication is automatically governed by the speed of the motor. A sight feed is provided on the dash.

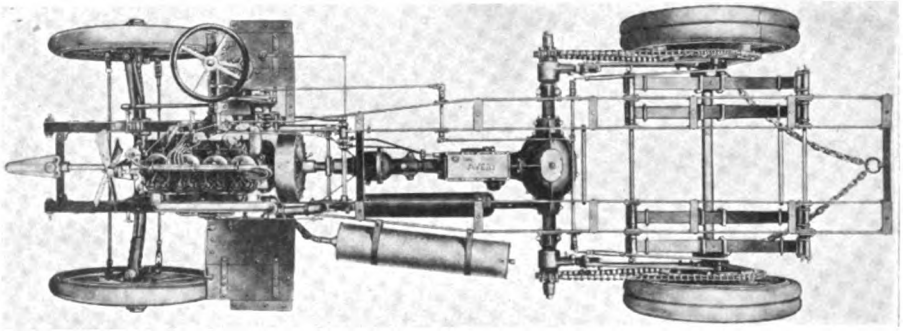
Locomotive principles have been incorporated in the construction of the Alco brakes. These are of the locomotive double shoe type. They are quickly accessible, easily applied, automatic and self-alining.

The emergency brakes are carried on the radius rods, which permits them to be in the proper position regardless of the spring deflection.

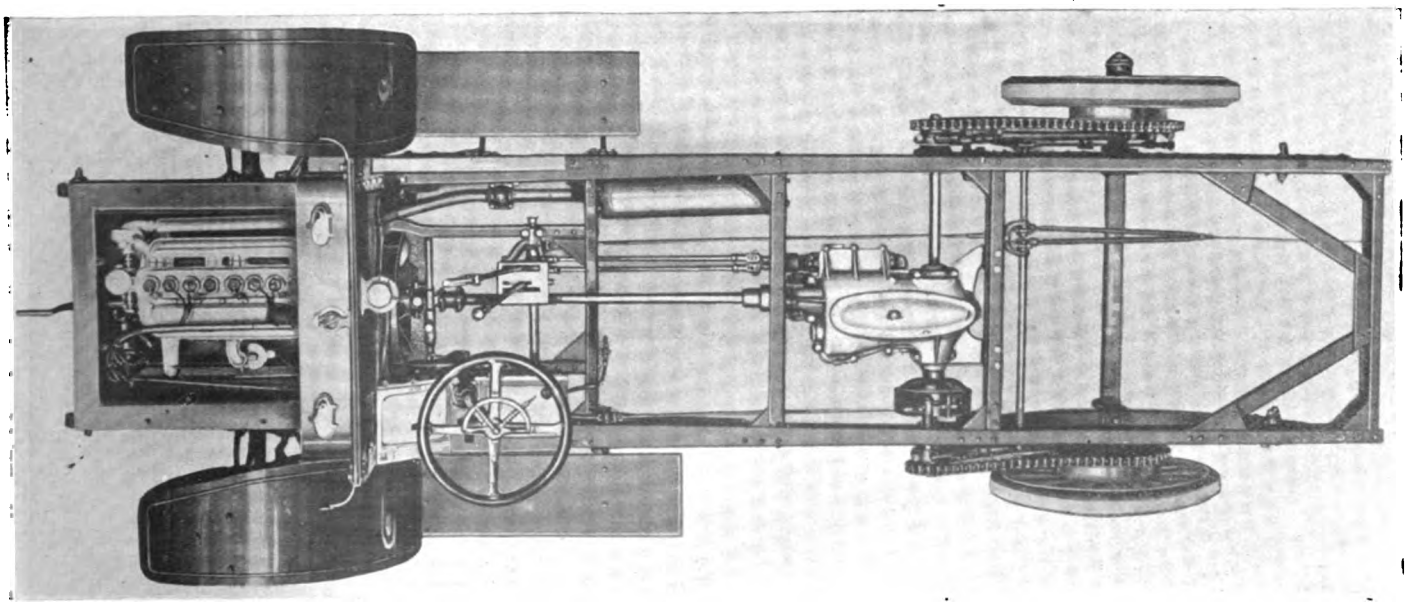
The heavy type of machine is fitted with an auxiliary spring that comes into action when 50 per cent of the maximum



American Locomotive Company's 5-ton chassis.



Chassis of Avery motor wagon.



Plan view of chassis of Adams 1-ton motor truck.

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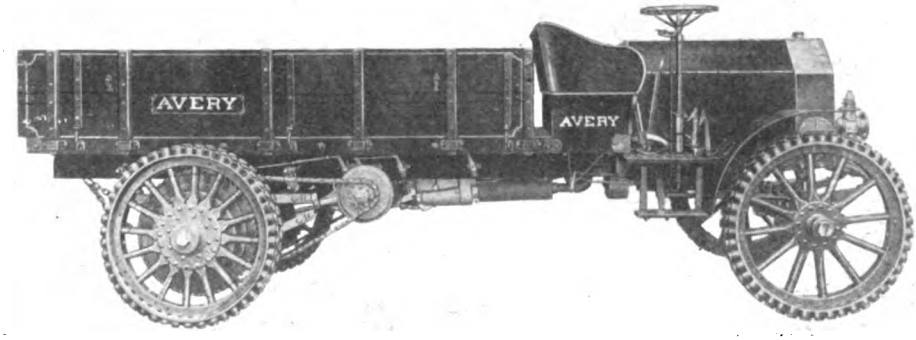
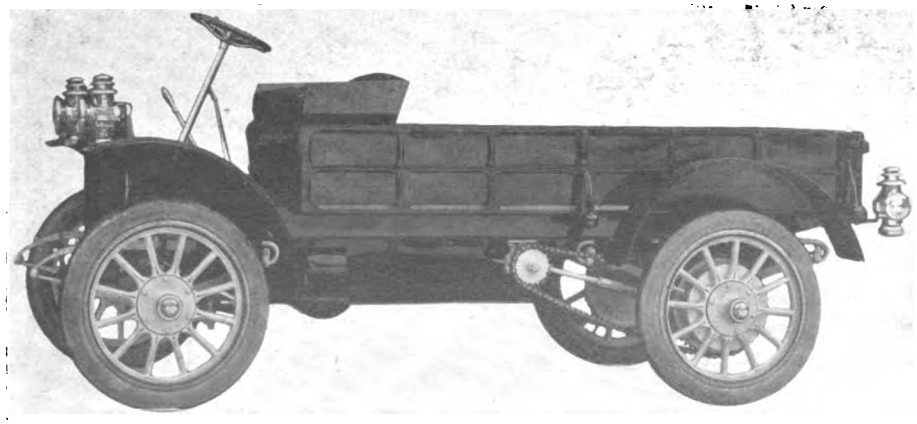
Anderson Electric Car Company's 1,000-pound electric.

An Avery power wagon.



Avery 3-ton model with cast steel rim wheels.



Buick 2-A truck with open body.

load is applied. This construction allows the semi-elliptic springs to carry 50 per cent of the maximum load easily, and the strain is partly taken off these springs when a greater load is placed upon the motor wagon.

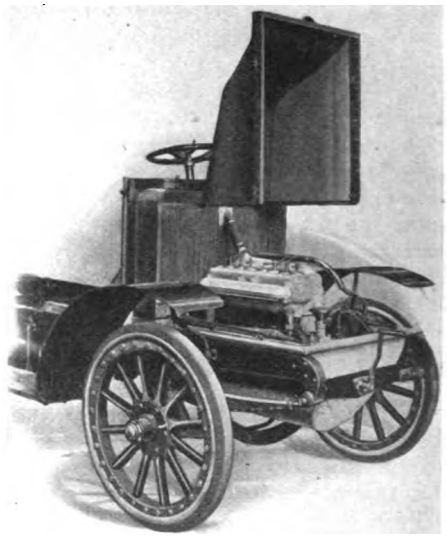
Details of design are fully given in the specification tables in this issue.

* * *

Anderson Electric Car Co., Detroit.

This concern manufactures the "Detroit" electric wagons, of the following load capacities: 1,000, 2,000 and 3,000 pounds. These machines are designed especially to use the Edison battery, which, as well as the motor and countershaft, is entirely inclosed.

Details of design are fully given in the specification tables in this issue.



Shows accessibility of motor on Adams power wagon.

Atterbury Motor Car Co., Buffalo.

This company makes 1, 2 and 3 ton gasoline motor wagons, a 24-passenger pay-as-you-enter gasoline motor bus, and a 20-passenger gasoline motor sight-seeing car.

Details of design are fully given in the specification tables in this issue.

* * *

Avery Company, Peoria, Ill.

This concern builds three styles of gasoline motor wagons—a 2-ton rubber-tired truck, a 3-ton rubber-tired truck, and a 3-ton cast steel rim wheel truck. One of the features of these machines is the flexibile steel plate frame of the chassis, for which greater flexibility than the ordinary channel steel frame is claimed, especially when the motor wagon travels over uneven roads. The drivers' seat is low down and at the side of the motor, which is said to permit of better load distribution and greater accessibility.

The Avery company also specializes in motor tractors, having a peculiar form of tire, with wooden plug inserts, to afford suitable traction on country roads and fields.

Details of design are fully given in the specification tables in this issue.

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Baker Motor Vehicle Co., Cleveland.

This company makes electric motor wagons of load capacities as follows: 800 to 1,200 pounds; 1,600 to 2,400 pounds; 3,500 to 5,000 pounds. The particular method of chain drive employed permits the flexible suspension above the springs of the entire power plant and a light solid rear axle construction of unusual strength.

Details of design are fully given in the specification tables in this issue.

* * *

Brush Runabout Co., Detroit.

This concern, which comprises one of the divisions of the United States Motor Company, makes a light gasoline delivery wagon of 600 pounds capacity. It is built for speed rather than for heavy loads, and is especially adapted for local tradesmen and light package delivery.

Details of design are fully given in the specification tables in this issue.

Brush motor van.

Buick Motor Co., Flint, Mich.

This concern builds a variety of gasoline wagons and buses with special bodies for different trades and purposes. The standard chassis has a load capacity of 1,000 to 1,800 pounds.

Details of design are fully given in the specification tables in this issue.

* * *

Cartercar Co., Pontiac, Mich.

This concern makes gasoline light delivery wagons with several styles of body. The standard chassis has a capacity of 1,000 to 1,500 pounds. The entire motor may be removed simply by removing the radiator, and taking out a few bolts.

Details of design are fully given in the specification tables in this issue.

* * *

Clark Delivery Car Co., Chicago.

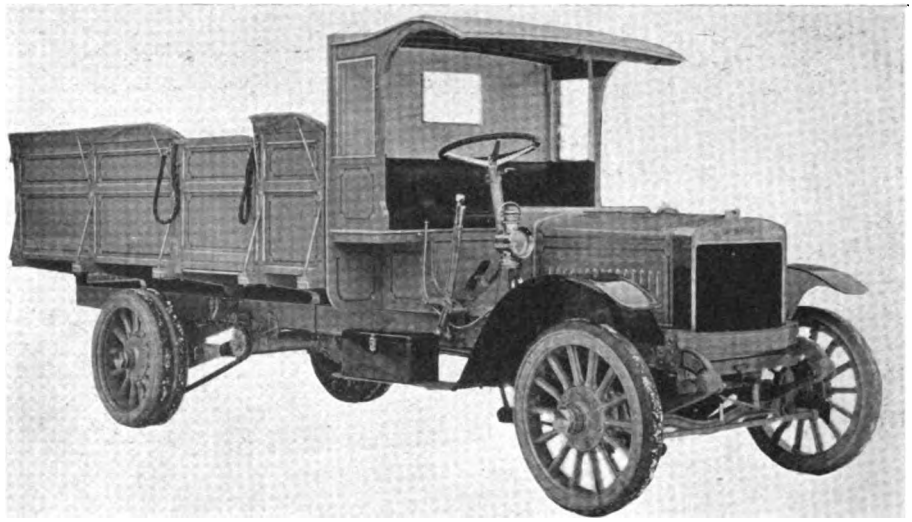
This company specializes in a 1-ton gasoline motor wagon, which is the result of three years of painstaking evolution. The chassis is adaptable also for hotel bus and police patrol bodies, etc. The motor is immediately accessible by removing the floor boards. The speed change gears are always in mesh.

* * *

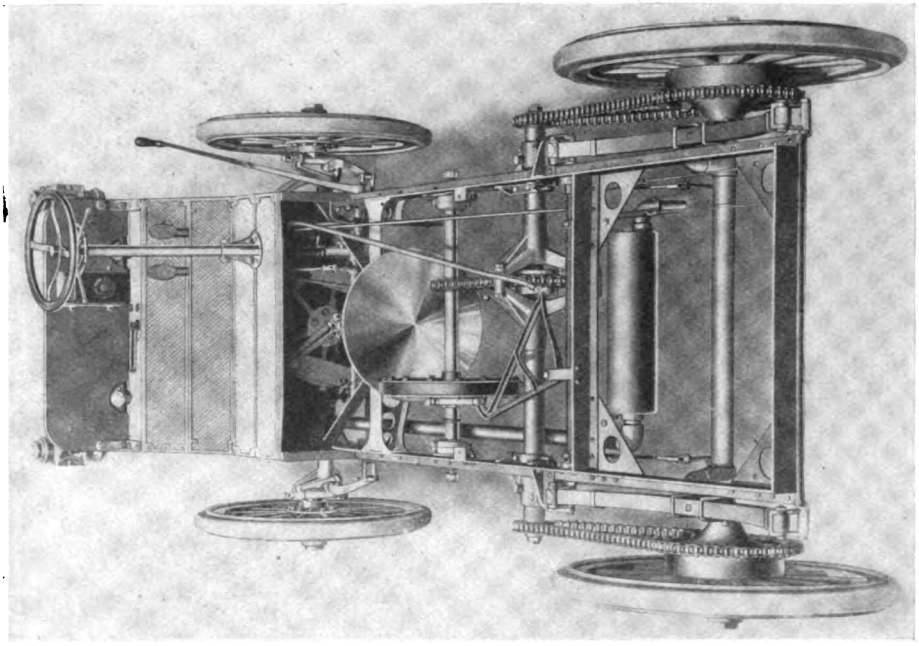
Commerce Motor Car Co., Detroit.

This company makes a friction drive 1,000-pound gasoline delivery wagon, with full panel or open body, and with pneumatic or solid tire equipment.

Details of design are fully given in the specification tables in this issue.



Atterbury motor wagon.



Cartercar friction drive model—This picture should be regarded sideways, from the right.

Clark Delivery Car Company's motor wagon.

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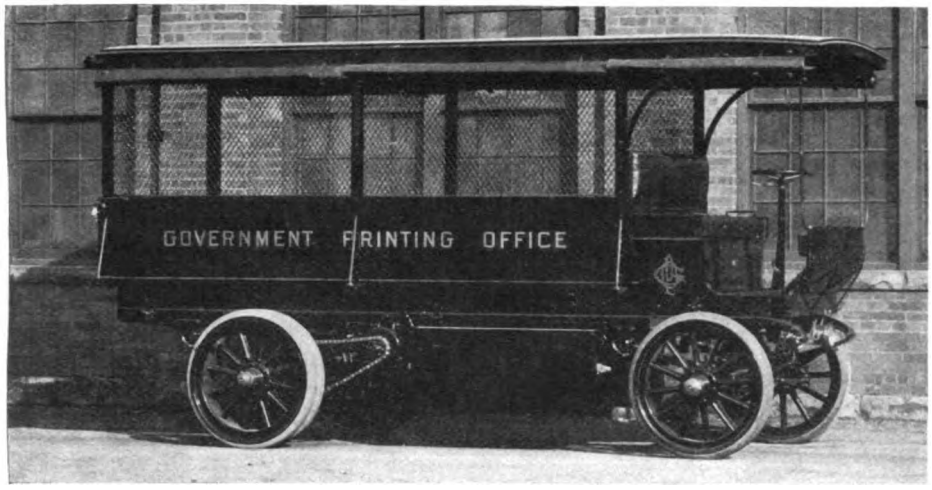
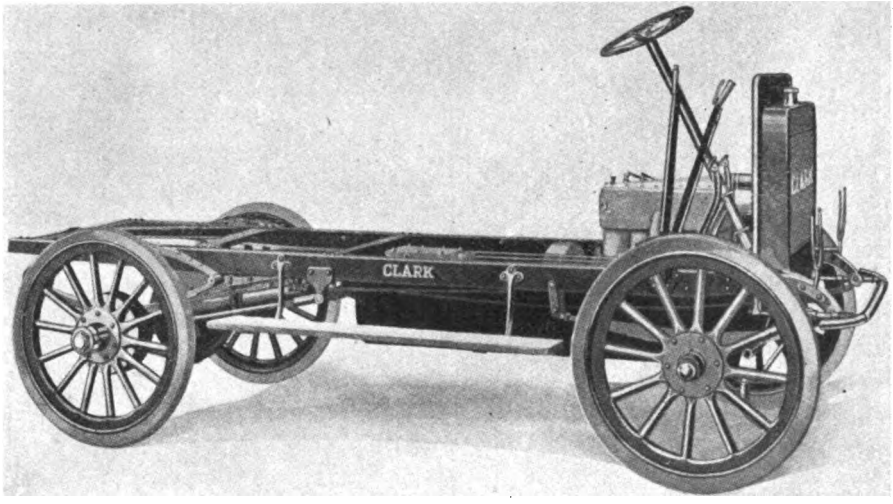
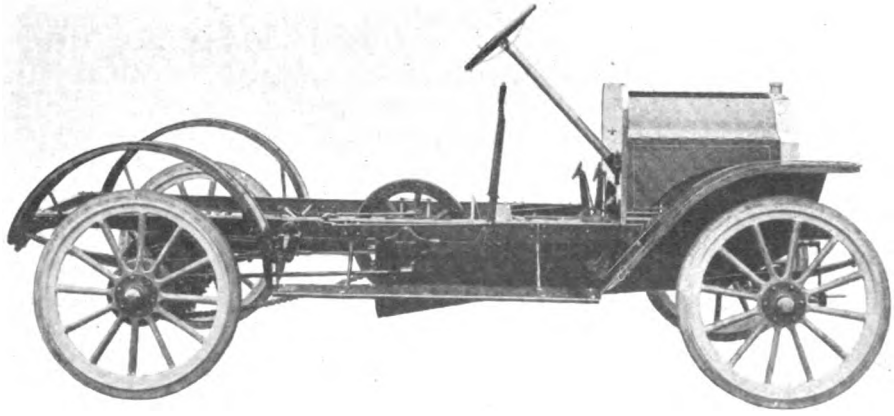


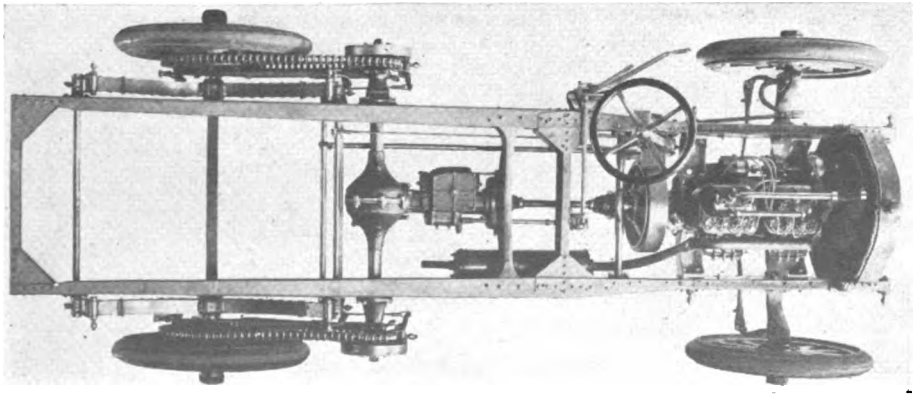
Baker electric in service of the U. S. Government Printing Office.



Chassis of the Clark motor wagon.



Commerce Motor Car Company's machine.



Federal chassis.

Dorris Motor Car Co. St. Louis.

This concern makes a gasoline motor delivery wagon of 1,500 pounds capacity and equipped with pneumatic tires.

Details of design are fully given in the specification tables in this issue.

* * *

Durant-Dort Carriage Co., Flint, Mich.

This concern makes a gasoline motor wagon of 800 pounds' capacity, with a 2-cylinder, double-opposed motor of 4½-inch bore and stroke, placed under the floor board in front of the driver's seat. The speed is governor-controlled to 18 miles an hour. Friction transmission is used. The radiator is spring-suspended.

Details of design are fully given in the specification tables in this issue.

* * *

Federal Motor Truck Co., Detroit.

This company specializes in 1-ton gasoline motor wagons, guaranteed against defective material and workmanship for 1 year. Several kinds of bodies are supplied, including express, stake and wire screen types.

Details of design are fully given in the specifications in this issue.

* * *

Garford Co., Elyria, Ohio.

This company makes gasoline motor wagons in 1, 2 and 3 ton models. Several types of body can be fitted. The machines are warranted against defects in workmanship and material for one year.

Details of design are fully given in the specification tables in this issue.

* * *

General Motors Truck Co., Detroit.

This concern makes gasoline and electric motor wagons of all capacities between 1,000 pounds and 6 tons. There are several companies included in this organization. The "Reliance" gasoline trucks made by this firm comprise 2½, 3½ and 5 ton models. The "Rapid" trucks—made by the Rapid Motor Vehicle Company, which is included in the General Motors Truck Company, include, 1, 2 and 3 ton models. The complete line thus comprises 1, 2, 2½, 3, 3½ and 5 ton models. It is possible that the manufacture of the 2½-ton machine may later be discontinued. These motor wagons are guaranteed for one year. The Reliance machines are examples of the "motor under the seat" type, which has many advantages.

Details of design are fully given in the specification tables in this issue.

* * *

General Vehicle Co., Long Island City.

This concern manufactures a very complete line of electric motor wagons, including 1,000 pounds, 2,000 pounds, 2-ton, 3½-ton and 5-ton models. These machines, supplied with appropriate bodies, are designed for all kinds of trucking and delivery service within the radius of their capacity.

Details of design are fully given in the specification tables in this issue.

* * *

Grabowsky Power Wagon Co., Detroit.

This concern makes many types of gasoline motor wagons, sightseers, buses, etc.

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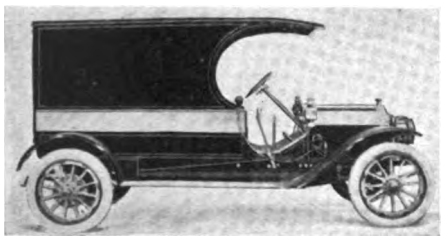
The standard chasses are made for the following load capacities: 1, 1½, 2, 3 and 5 tons. The Grabowsky is the motor wagon with the unique removable power plant, which slides out like a drawer, for partial or complete removal. The radiator is placed in a steel cradle which is pivoted at both ends, its motion being restricted so as to avoid undue strain or rattle.

Details of design are fully given in the specification tables in this issue.

* * *

Gramm Motor Truck Co., Lima, Ohio.

This company manufactures gasoline motor wagons in 1, 2, 3 and 5-ton models. The special features of these machines, according to the makers, are "the Gramm type of roller spring suspension, the three-point suspension of the motor and transmission; the flexible construction of the frame; the support of the radiator upon coiled springs, eliminating vibration; multiple disk clutch; vertical four-cylinder motor of ample size; selective transmission, four speeds forward on the 3 and 5-ton models; the use of Timken bearings wherever they are adaptable; and finally the use of nothing but the highest grade of material obtainable."



Dorris motor wagon.

Details of design are fully given in the specification tables in this issue.

* * *

Harder's Fire Proof Storage & Van Co., Chicago.

This company makes a complete line of gasoline models, ranging from 1½ to 7½ tons load rating, both motor wagons and fire trucks.

* * *

Harwood-Barley Mfg. Co., Marion, Ind.

This concern makes the "Indiana" gasoline motor wagon of 3,000 pounds load rating. All machines are fully guaranteed for one year from date of shipment. Express and platform bodies are supplied as regular equipment, special bodies on request.

Details of design are fully given in the specification tables in this issue.

* * *

Thos. B. Jeffery Co., Kenosha, Wis.

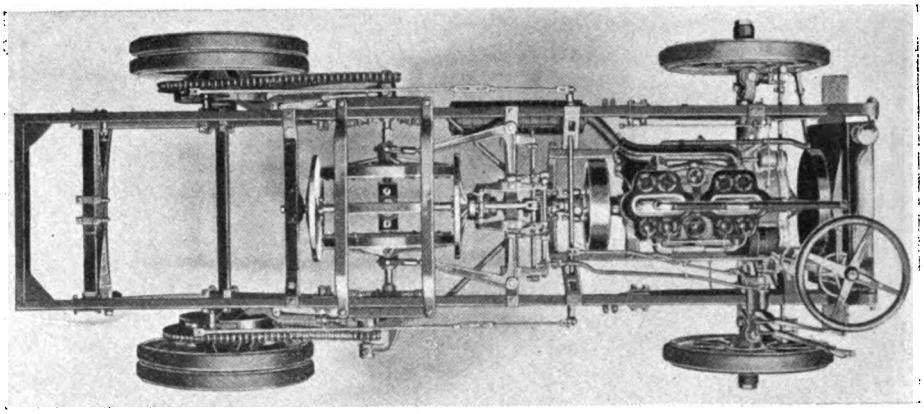
This concern specializes in municipal motor wagons, including fire apparatus, police patrols, ambulances, etc.

* * *

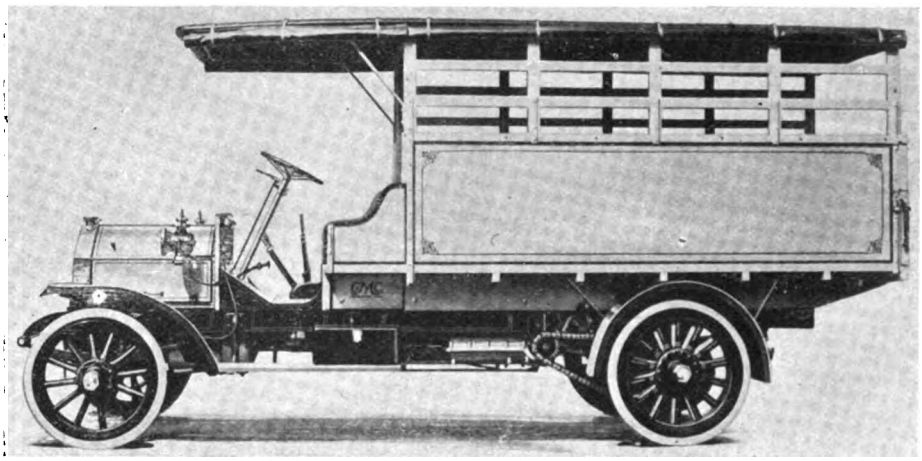
Kelly Motor Truck Co., Springfield, O.

This concern makes 1-ton, 2-ton and 3-ton gasoline motor wagons, including the new 1-ton model.

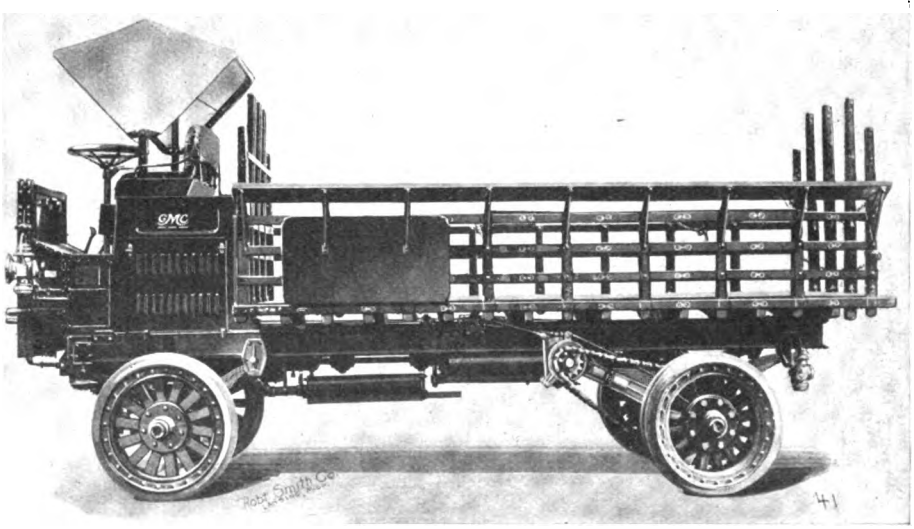
According to the manufacturers "There are 200 operations in the production of a



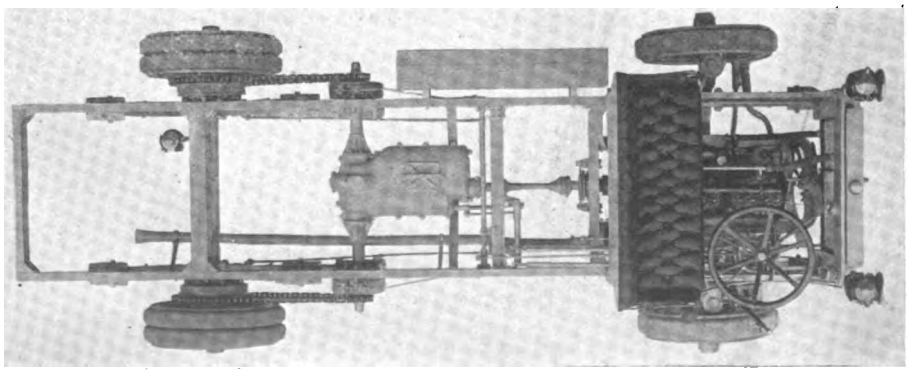
Garford chassis.



General Motors Truck Company's 2-ton machine.



General Motors Truck Company's 5-ton motor wagon.



Gramm 3-ton chassis.

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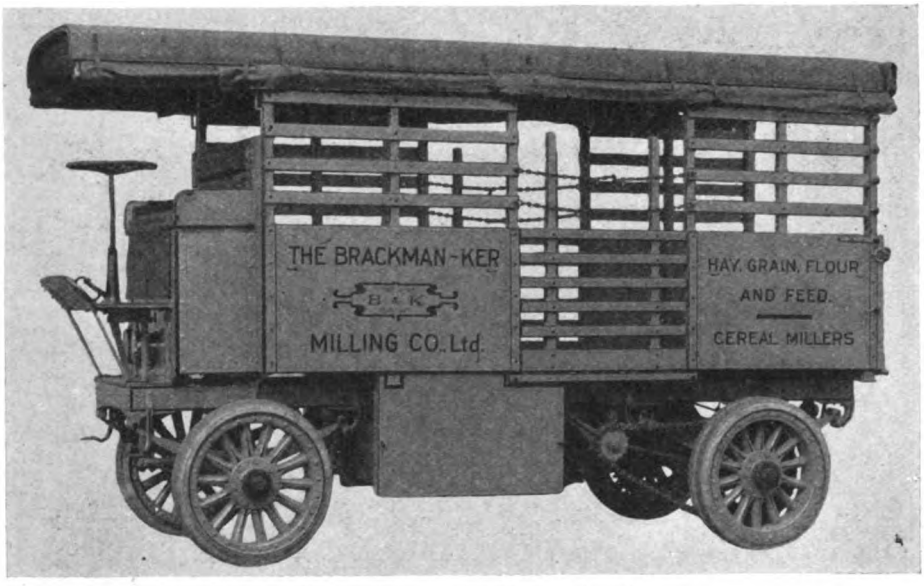
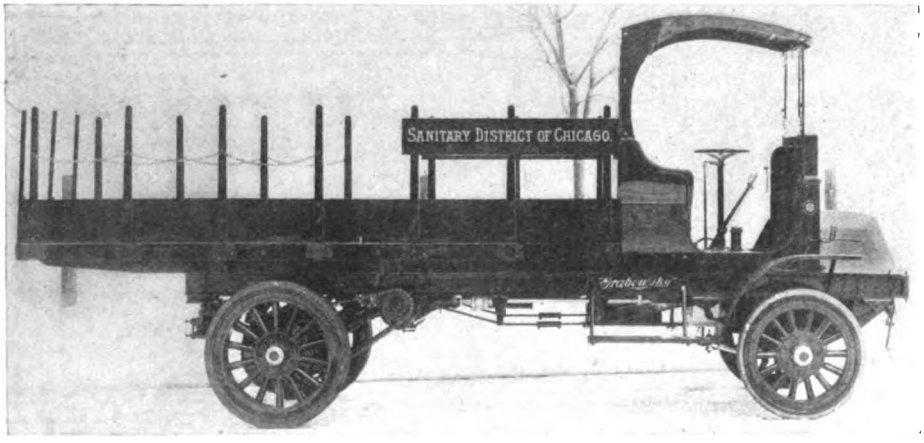
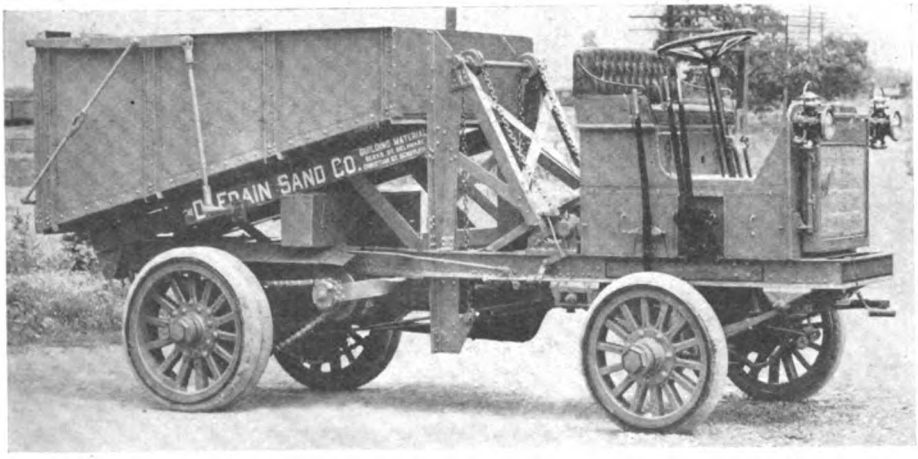


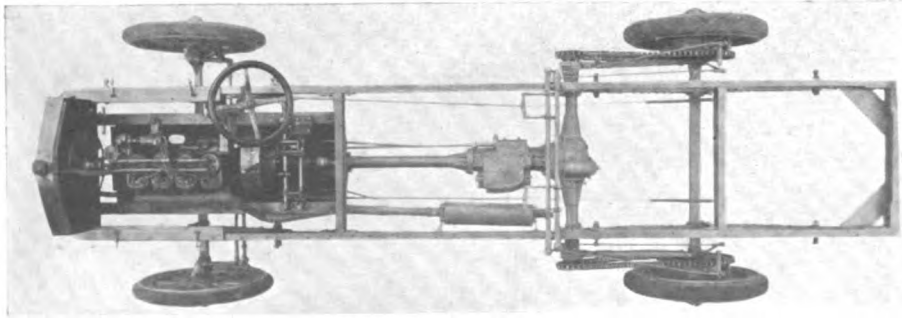
General Vehicle Company's 3½-ton electric wagon.



Grabowsky 3-ton power wagon.



Gramm 5-ton power wagon with special sand dumping body.



Harwood-Barley chassis.

Kelly truck, in which the limit of error is held to 1-1,000 of an inch; 20 operations in which the limit of error is betwen 1-1,000 and 1-2,000 of an inch; and 30 operations in which the limit of inaccuarcy is 1-4,000 of an inch. To the layman, unaccoustomed to the tools and gauges used in this work, such measurements do not seem possible—nor do they seem necessary. Yet it is just such microscopic points as this that make the great difference in motor trucks' operating costs. To attain such results it is necessary to have special jigs, fixtures, and gauges for every machine operation on the car.

"With the exception of the spring clip where compression of the springs will vary a little, every cotter hole in every bolt on the Kelly truck is drilled on a jig before it goes to an assembly floor. The sound of a file, chisel, drill, or emery cloth is seldom heard on any erecting floor in the Kelly factory. This means not only added life, reduced friction, and, therefore, reduced wear, but it also means that if at any time it is necessary to order a repair part this part will fit into place perfectly without adjustment."

Details of design are fully given in the specification tables in this issue.

* * *

Kissel Motor Car Co., Hartford, Wis.

This company makes gasoline motor wagons of 1,500 pounds, 2, 3, 4 and 5 tons load rating, a special fast delivery wagon equipped with rubber tires and a 50-horse power motor capable of speeding up to 40 miles an hour, and also a chemical motor fire truck. Kissel machines are perfectly standardized, thus facilitating replacements. Many types of bodies are made.

Details of design are fully given in the specification tables in this issue.

* * *

Knox Auto. Co., Springfield, Mass.

This concern makes a very complete line of motor wagons, buses, fire apparatus, etc. Chassis load ratings are 2, 3, 4, 5 and 6 tons, respectively. There are three types of 2-ton model.

Details of design are fully given in the specification tables in this issue.

* * *

Lauth-Juergens Motor Car Co., Fremont, O.

This concern makes a line of 1-ton, 2-ton and 3-ton gasoline motor wagons, and 5, 6 and 10-ton machines to special order.

Details of design are fully given in the specification tables in this issue.

For further particulars, see the "Power Wagon" for December, 1911, pages 84 to 86.

* * *

Henry Lee Power Co., Chicago.

This company makes the "Old Reliable" 3½-ton gasoline power wagon. Special features include the "Kline" eccentric brake (which pulls up the machine in inches if necessary), the governor on the

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jackshaft, and special spring suspension, the springs being guaranteed against breakage from any cause during the life of the motor wagon.

* * *

Locomobile Co., Bridgeport, Conn.

This concern makes 3 and 4 ton gasoline motor wagons.

Details of design are fully given in the specification tables in this issue.

* * *

Lozier Motor Co., Detroit.

This concern makes a 5-ton gasoline motor wagon, of which a very full description was given in our last issue.

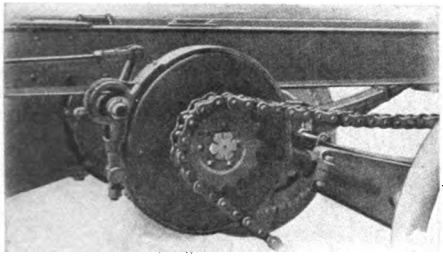
Details of design are fully given in the specification tables in this issue.

* * *

Mack Bros. Motor Car Co., Allentown, Pa.

This concern makes gasoline motor wagons of the following load capacities: 1, 1½, 2, 3, 4, 5 and 7 tons. Special bodies for these include: express, furniture, brewery (heavy stake body with racks and gates on each side or loose stakes with chains—also open style without roof, and body with roof top), half van, full van, grocery, stake, dumping (various kinds), etc.

The 2 ton chassis may be furnished, if



Kline patent eccentric brake used on "Old Reliable" motor wagons made by Henry Lee Power Co.

desired, with the 3 ton rear equipment; the 3 ton chassis with the 5 ton rear equipment; the 5 ton chassis with the 7 ton rear equipment. The "rear equipment" comprises the rear axles, springs, wheels and tires.

The latest specialty of this concern is a 7½ ton dump truck, operated by the power of the driving engine.

Details of design of the standard chasses are fully given in the specification tables in this issue.

* * *

Mais Motor Truck Co., Indianapolis.

This company makes gasoline motor wagons in 1½ and 2½ tons load capacities, respectively. There are many unusual, but quite practical features of design, chief of which is the internal gear drive shown in one of the illustrations.

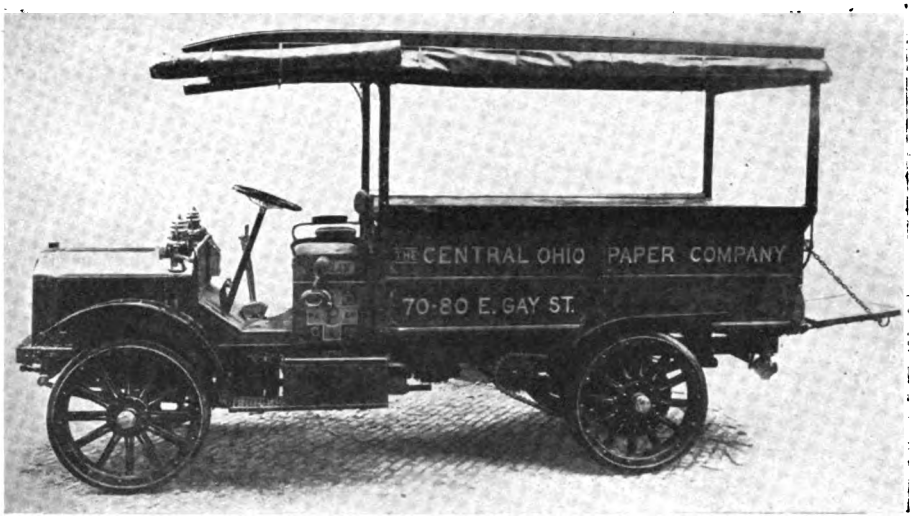
Details of design are fully given in the specification tables in this issue.

* * *

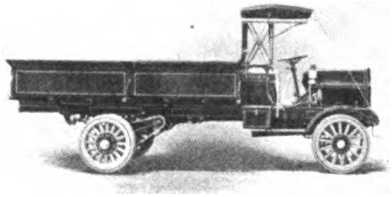
W. H. McIntyre Co., Auburn, Ind.

This concern specializes in light gasoline motor wagons of the following load ratings: 500, 600, 1,200, 1,500, 2,000 and 2,500 pounds.

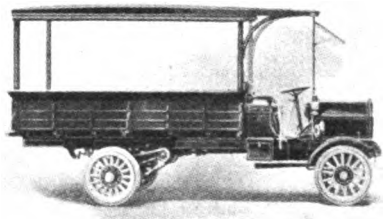
The chasses of these machines are manu-



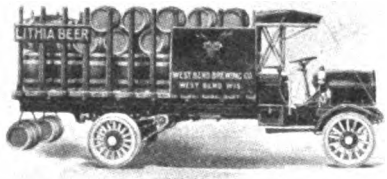
Kelly 1-ton motor wagon.



3 Ton Truck with Packers Body



3 Ton Truck with Express Body



3 Ton Brewers Truck

3 Ton Truck with closed Body

Four of many KisselKar 3-tonners.

The 3½-5 ton "Old Reliable" motor wagon, made by the Henry Lee Power Co. of Chicago.

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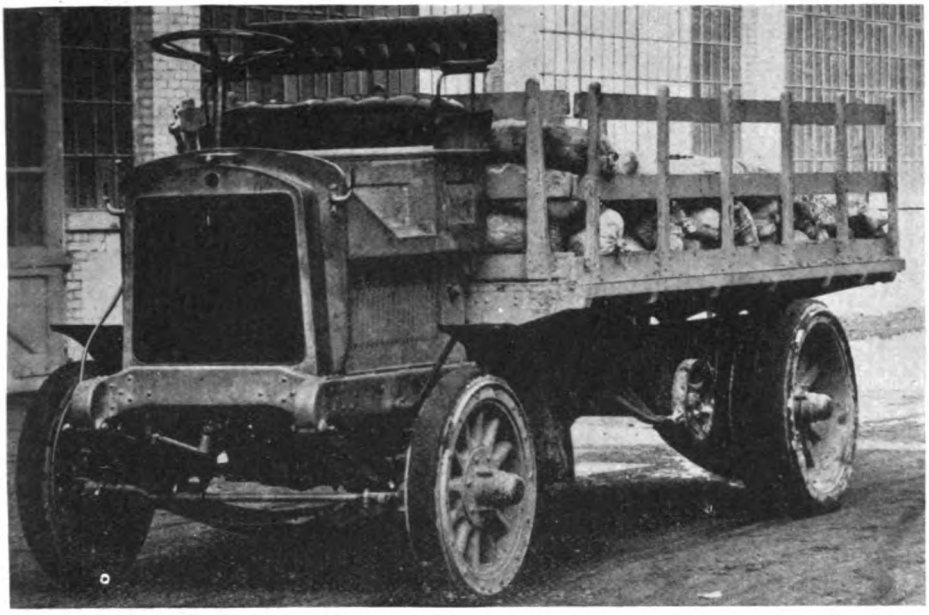
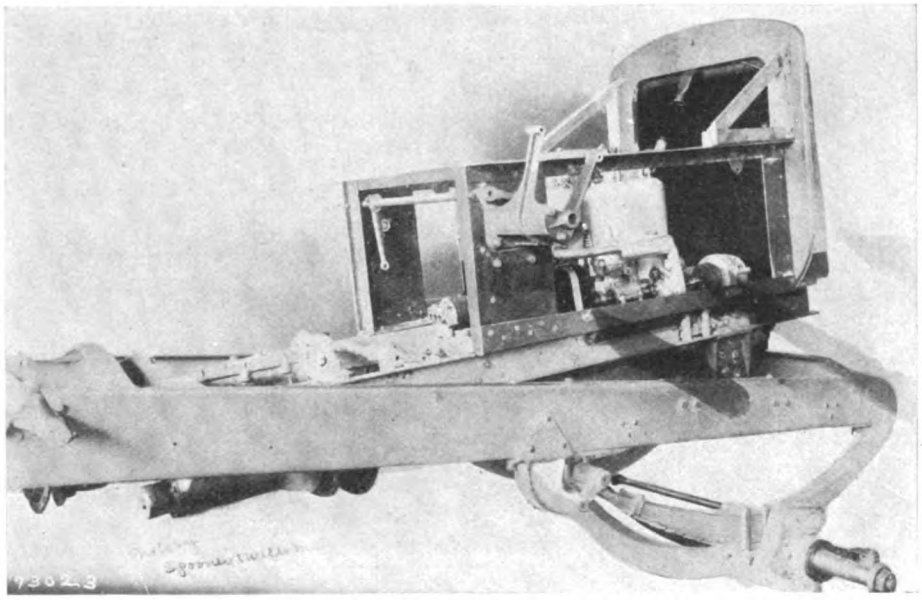
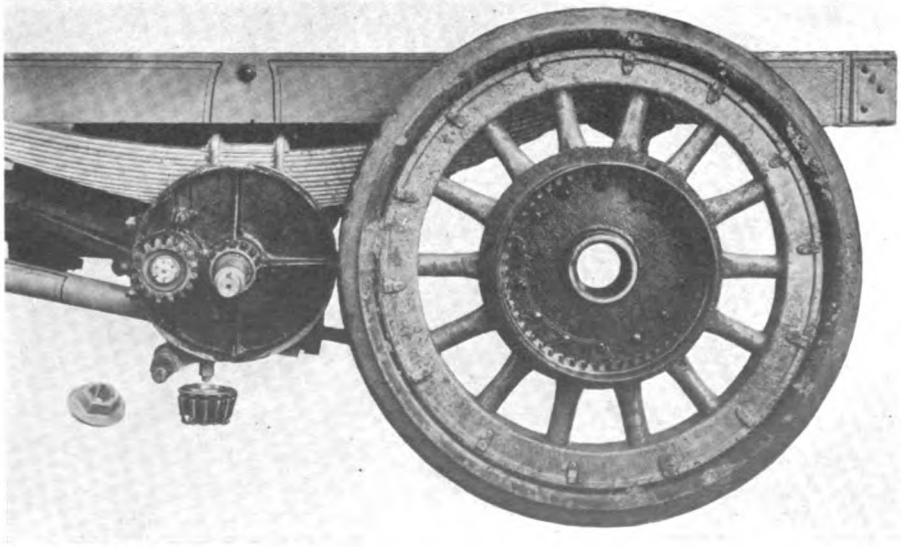


Lozier 5-ton power wagon.



Subframe of Lozier 5-ton truck, showing hinged support at rear, also accessibility to motor by raising subframe.



The Mais internal gear drive—rear wheel removed.

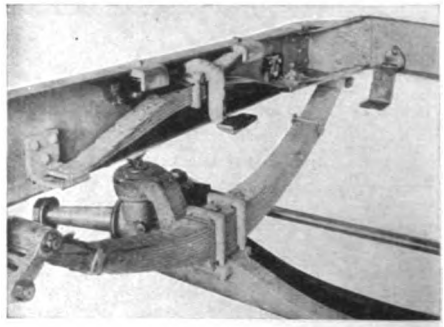
factured from heavy steel, angle section, well riveted and substantially braced where needed. In two of the models the motor is suspended on a sub-frame, thus forming a unit which may be removed without disturbing any other parts.

Details of design are fully given in the specification tables in this issue.

* * *

Mercury Mfg. Co., Chicago.

This concern makes a fast, light motor wagon of 1,000 pounds capacity, suitable especially for city package delivery. Several conventional types of body are made, the latest product of the company being the natty little fore-door machine shown in one of the accompanying illustrations. Special features include the Mercury unit power plant (motor and transmission), all inclosed in an oil-tight, dust-proof housing, and a simple device which permits



Front main spring and subframe on Lozier 5-ton truck.

all speed changes to be controlled with a single lever.

Details of design are fully given in the specification tables in this issue.

* * *

Monitor Auto Wks., Janesville, Wis.

This concern makes a 1-ton gasoline motor wagon with types of bodies suited to any special requirements. A straight-line shaft drive is used.

Details of design are fully given in the specification tables in this issue.

* * *

Morgan Motor Truck Co., Worcester, Mass.

This concern makes 2, 3 and 5 ton gasoline motor wagons, and furnishes any and all types of bodies to meet the various requirements of the users. The machines are warranted for one year.

The Morgan motor wagon is designed upon the unit system, and comprises essentially four complete units, as follows: engine; transmission, jackshaft and differential; frame and springs; axles and wheels. Any and each of these units may be easily separated from the motor wagon as a whole. Universal joints and couplings are used throughout.

Details of design are fully given in the specification tables in this issue.

* * *

Motor Wagon Co., Detroit.

This concern specializes on an 800-pound gasoline wagon with bodies as

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follows: Open express, stake and full panel, of various sizes.

Details of design are fully given in the specification tables in this issue.

* * *

National Motor Truck Co., Bay City, Mich.

This company makes the "Natco" gasoline motor wagons. At present a 2,000-pound model is being produced. A 4,000-pound machine will shortly be announced.

The special features include: Compactness of design (giving large loading area with short turning radius), true long stroke motor, inclosed chain drive with special chain case adjuster and oil-retaining device. A full description was given in the November, 1911, issue of the "Power Wagon."

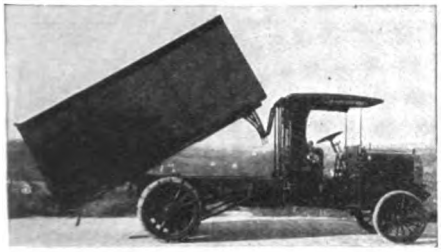
Details of design are fully given in the specification tables in this issue.

* * *

Packard Motor Car Co., Detroit.

This concern makes 2 and 3 ton gasoline motor wagons.

The Packard chassis is a complete unit to which any standard or special body may



Mack 5-ton sawdust dump truck with power hoist.

be attached. It is designed to carry 90 per cent of the load on the rear axle, thereby permitting the use of lighter front springs which reduce to a minimum the jar to the motor from traveling over rough pavements, besides making steering easier, reducing the tendency to skid, and securing better traction.

Service brakes are placed on ends of the countershaft, thereby taking all braking strain from the transmission and differential unit; this also is of great advantage owing to three to one reduction by braking through sprockets.

The brakes are designed so that the shoes on both service and emergency brakes are readily replaceable.

A flexible gasoline pipe is provided from the tank to the carburetor to prevent crystallization and breakage.

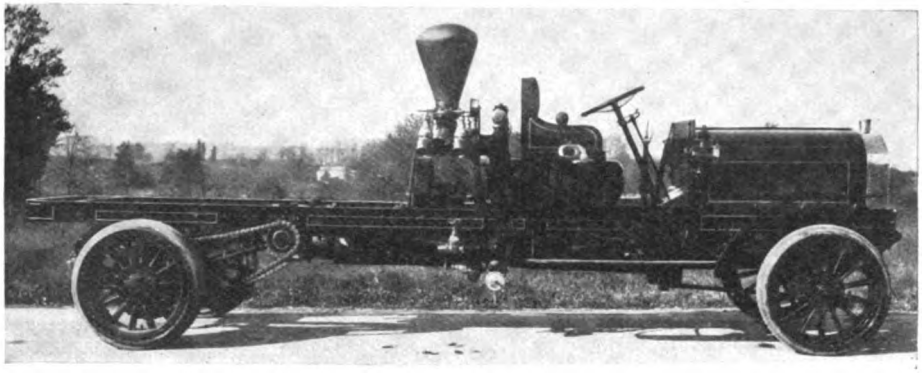
The clutch is completely supported on the crankcase, securing permanent alinement of crank and clutch shafts.

The spark is automatically retarded by the pushing in of the starting crank when the motor is being started.

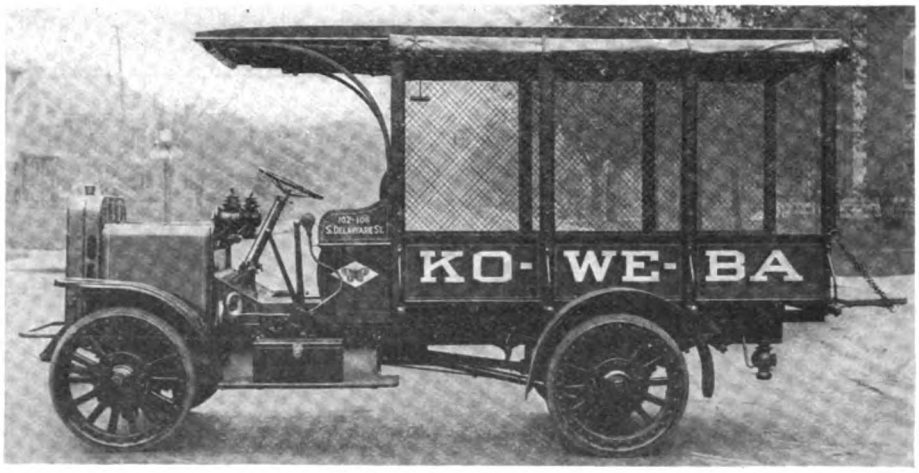
Motor speed is automatically controlled by sealed governor, with manual control of the throttle within limits of the governor control.

The 3 ton chassis is furnished in four, and 2 ton chassis in two, lengths of wheelbase, each wheelbase having a standard

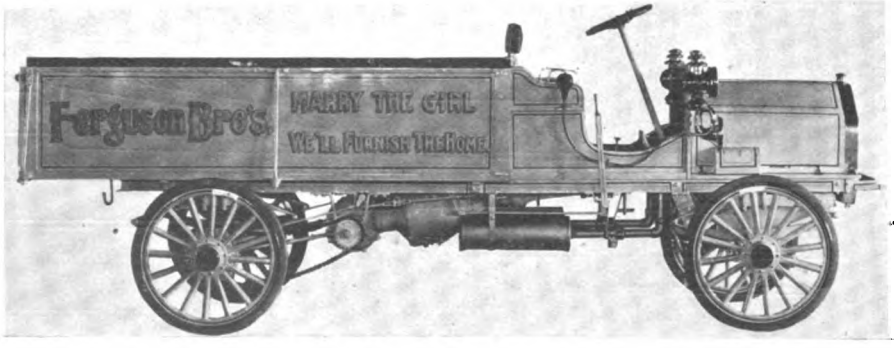
The Mack 7-ton brewery truck.



Mack special fire chassis fitted with Gould pump.



Mais power wagon.



McIntyre Model XIV.

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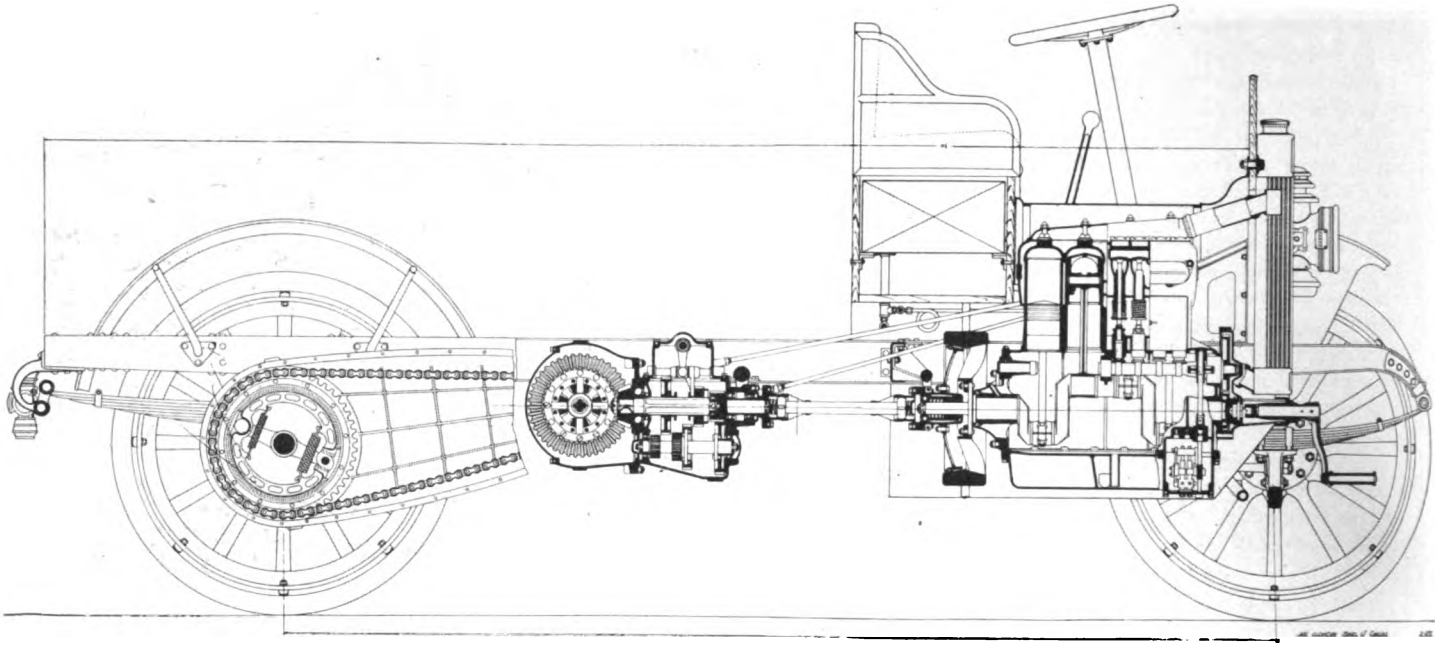
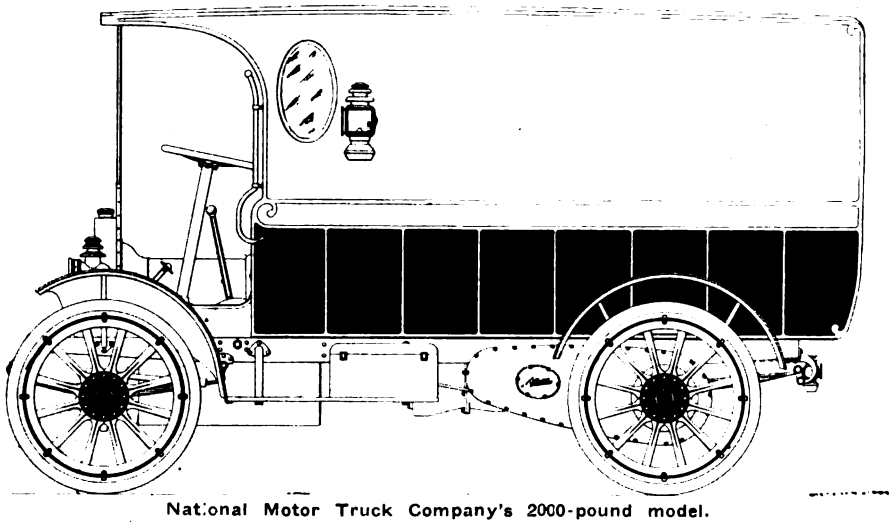


Sectional side elevation of "Natco" 2000-pound model.



National Motor Truck Company's 2000-pound model.

and numerous optional lengths of platform, making the machine adaptable to almost any line of business.

Details of design are fully given in the specification tables in this issue.

* * *

Packers Motor Truck Co., Wheeling, W. Va.

This concern makes gasoline motor wagons in 4,000 and 7,000 pound models.

Details of design are fully given in the specification tables in this issue.

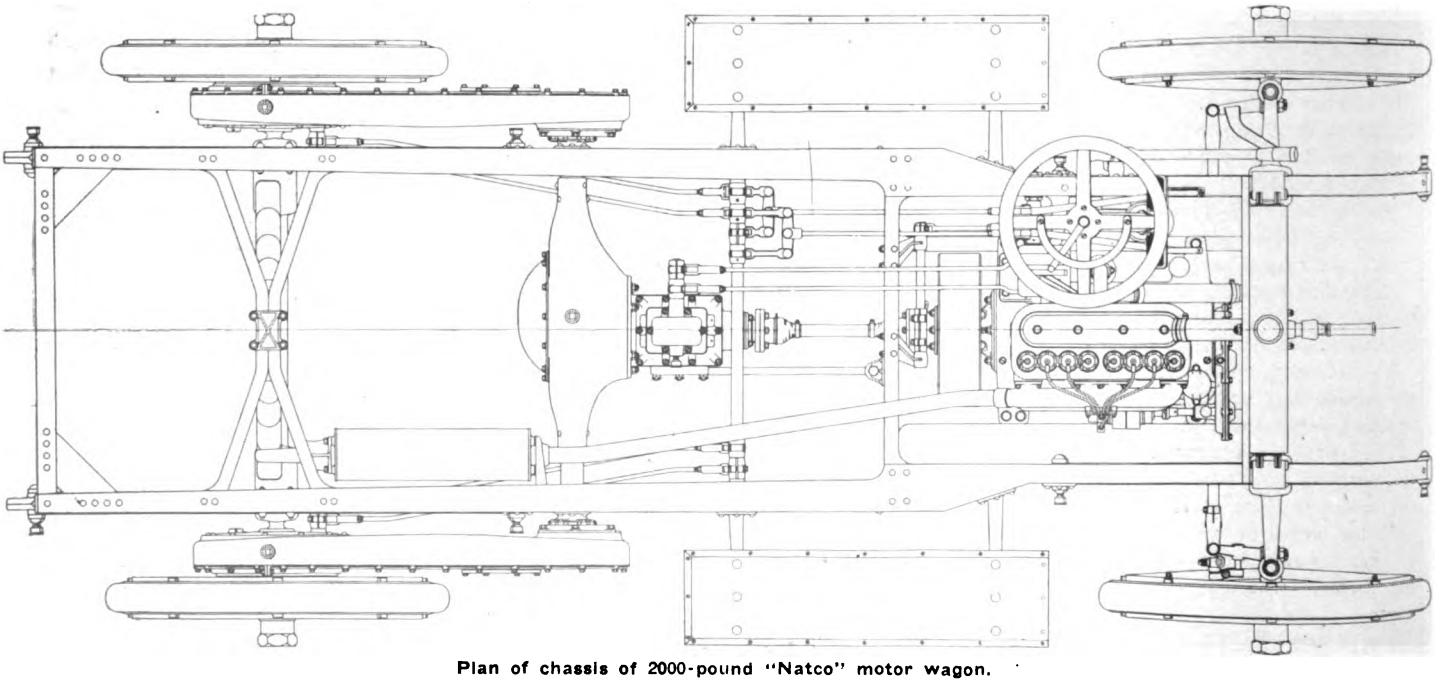
* * *

Peerless Motor Car Co., Cleveland.

This company makes 3 and 4 ton capacity gasoline motor wagons.

The most important features of design are as follows:

Distribution of load, which is about 80 per cent over the rear wheels, giving ade-



Plan of chassis of 2000-pound "Natco" motor wagon.

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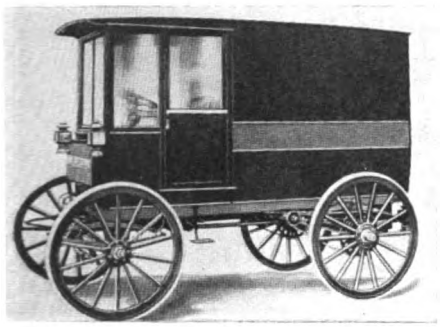
quate traction and allowing the use of light flexible front springs, which minimize vibration on the motor.

Fifty-six inch rear springs in connection with exceedingly large rear wheels, which make for the maximum economy in tire mileage and for easy riding qualities.

Long stroke, slow speed motor operating through an exceptionally large transmission, with wide faced sprockets and liberally proportioned chains and roller bearings make for the minimum wear on the motor and transmission parts, thus resulting in maximum economy in service.



Mercury fore door wagon.

The low center of gravity, making possible a nearly straight line drive results in minimizing the strains on the torsion rods, chains, etc.

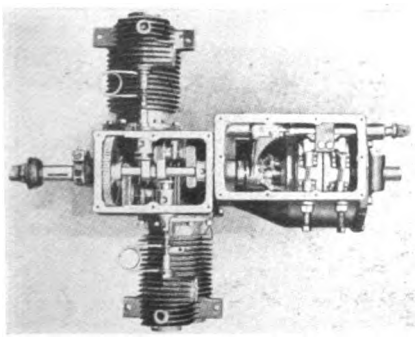
Details of design are fully given in the specification tables in this issue.

* * *

Poss Motor Co., Detroit.

This concern makes a 1,000-pound gasoline model with solid or pneumatic tires and express and panel bodies.

Details of design are fully given in the specification tables in this issue.

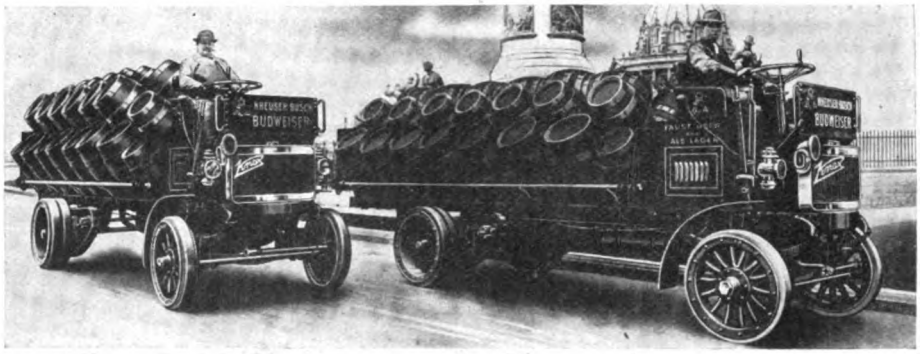


Mercury unit power plant.

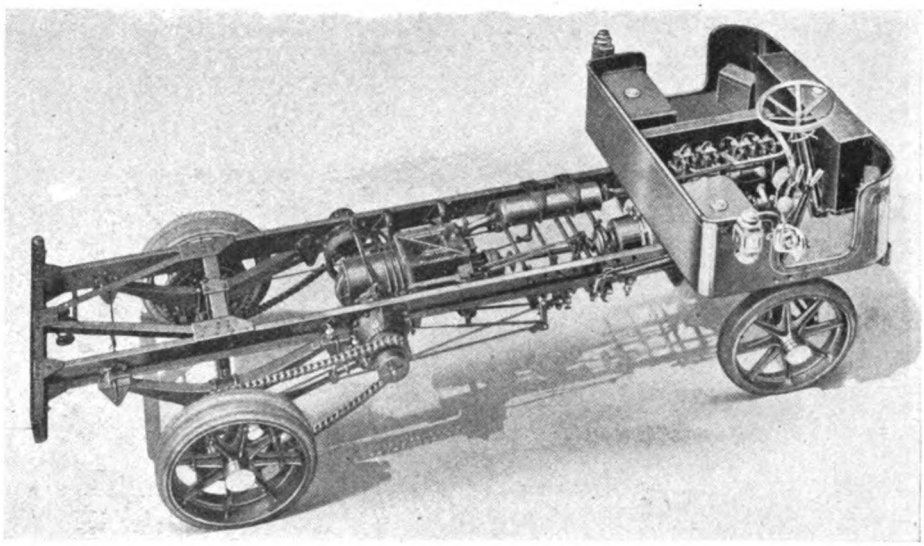
Pierce-Arrow Motor Car Co., Buffalo.

This concern makes a 5 ton gasoline motor wagon. This machine is of the type with the motor in front of the dash, and the driver directly behind. The control is practically the same as is used in Pierce-Arrow touring cars. The company has, in its experience, found this arrangement to be greatly preferable to placing the driver over the motor.

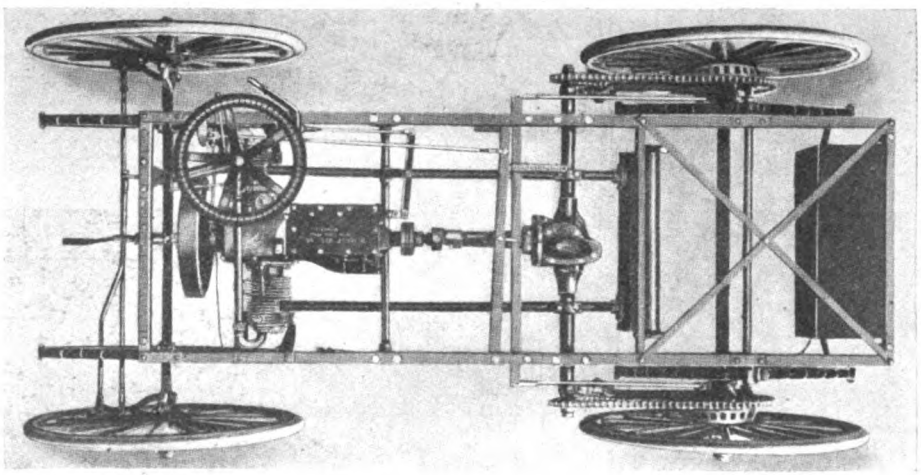
The rear wheels are located very nearly in the center of the length of the platform, thus placing practically the entire load on the rear wheels, this being the European practice. With the weight thus distributed the traction is much more positive and the problem of the tires is taken care of by



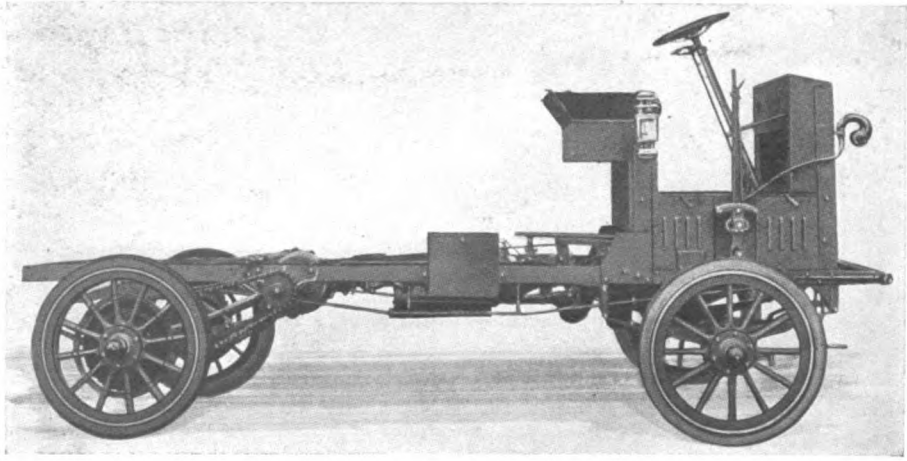
Knox brewery wagons.



Morgan 3-ton chassis.



Mercury chassis.



Lauth-Juergens 1-ton, 2-cylinder chassis.

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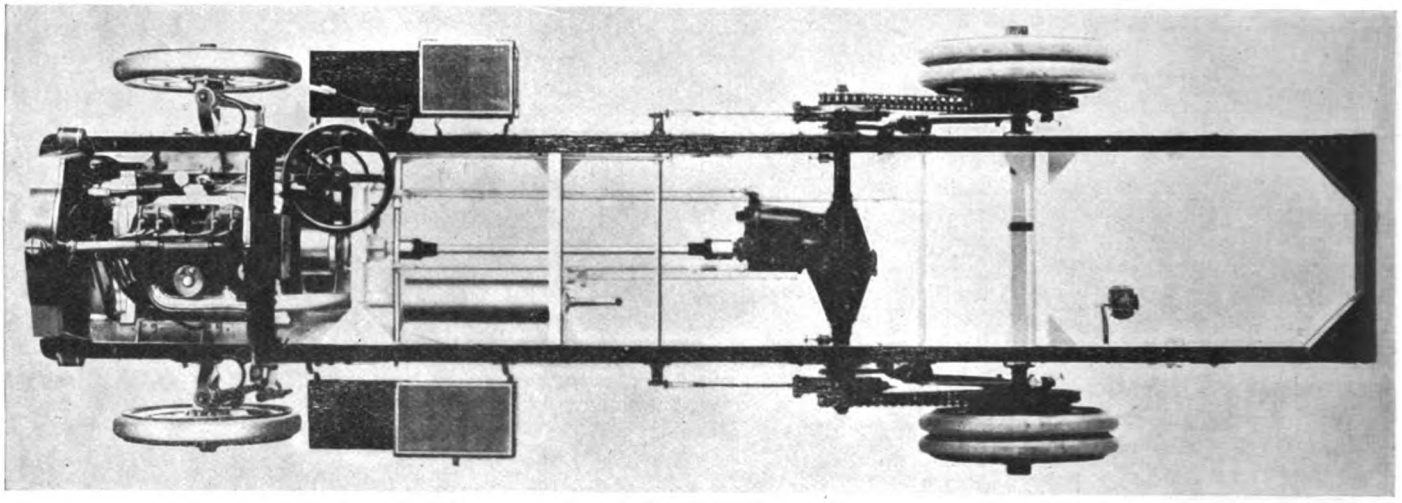
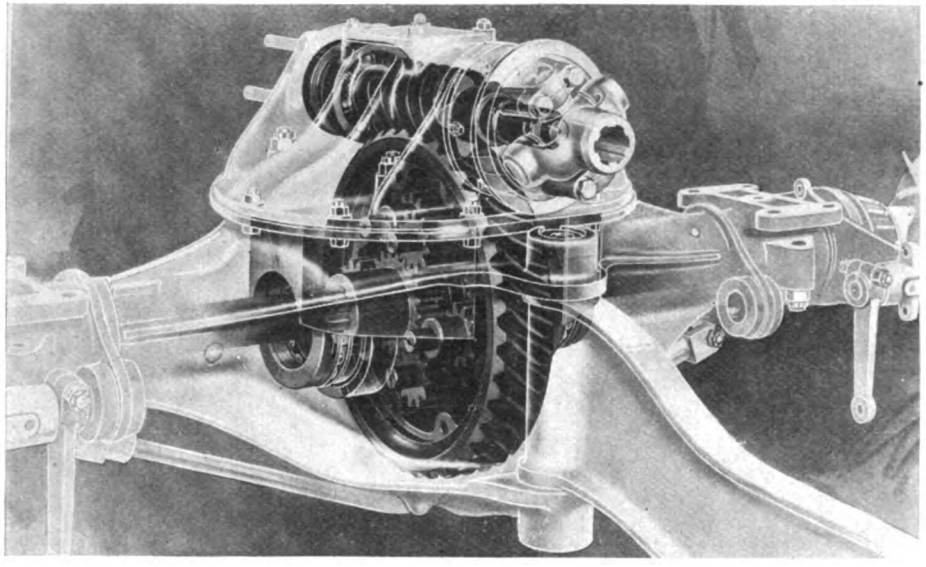


Plan of Packard 3-ton chassis.



Phantom view of Pierce-Arrow 5-ton truck worm-driven axle.

making these sufficiently large to carry the load; increased braking ability is afforded as the rear wheels are not so susceptible to being locked and skidding is not so liable to occur.

Details of design are fully given in the specification tables in this issue.

* * *

Pope Mfg. Co., Hartford, Conn.

This concern makes a 3 ton gasoline motor wagon, besides specializing in public service machines, including combination chemical and hose wagons, flying squadron wagons, salvage corps wagons, fire patrol wagons, chiefs' wagons, hose wagons, police patrols, ambulances and busses.

Details of design are fully given in the specification tables in this issue.

Details of equipment may be obtained from the company.

* * *

Rapid Motor Vehicle Co., Pontiac, Mich.

This concern is included in the General

Pierce-Arrow 5-ton truck with special coal dumping body which is particularly useful for unloading coal near the sidewalk level, while the chutes at the side provide for high-level unloading.

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Motors Truck Company's organization, which makes a complete line of gasoline and electric wagons of from 1,000 pounds to 6 tons capacity. The Rapid company makes gasoline wagons.

* * *

Reliance Motor Truck Co., Owosso, Mich.

This concern is included in the General Motors Truck Company's organization.

* * *

Reo Motor Truck Co., Lansing, Mich.

This concern (the general sales agent is R. M. Owen & Co.) makes light delivery gasoline motor wagons of 1,500 pounds maximum load capacity.

Details of design are fully given in the specification tables in this issue.

* * *

Alden Sampson Mfg. Co., Detroit.

This concern makes a very complete line of gasoline motor wagons, including models of the following load ratings: 1,000 pounds, 1½ tons, 3 tons, 5 tons.

The following special features of Sampson motor wagons are specialized for one's attention by the makers:

"Cases for chain-driven trucks—long life; economy.

"Differential lock—pulls truck out of holes and slippery places.

"Gear shifting interlock—prevents abuse to gears; safety.

"Immediate accessibility of parts—simplicity.

"Unusual strength of all parts—long life.

"Unusually large wearing surfaces—long life.

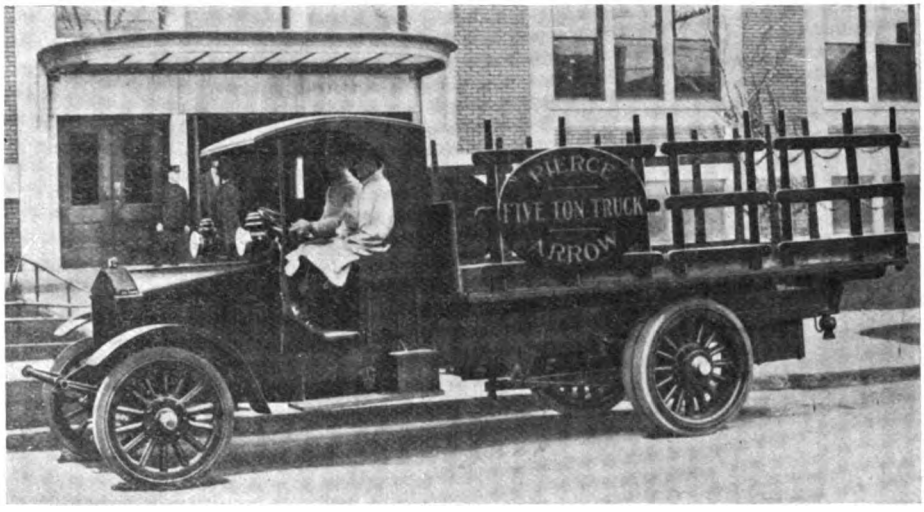
"Motor specially designed in Sampson factory.

"Lubrication automatic and thorough.

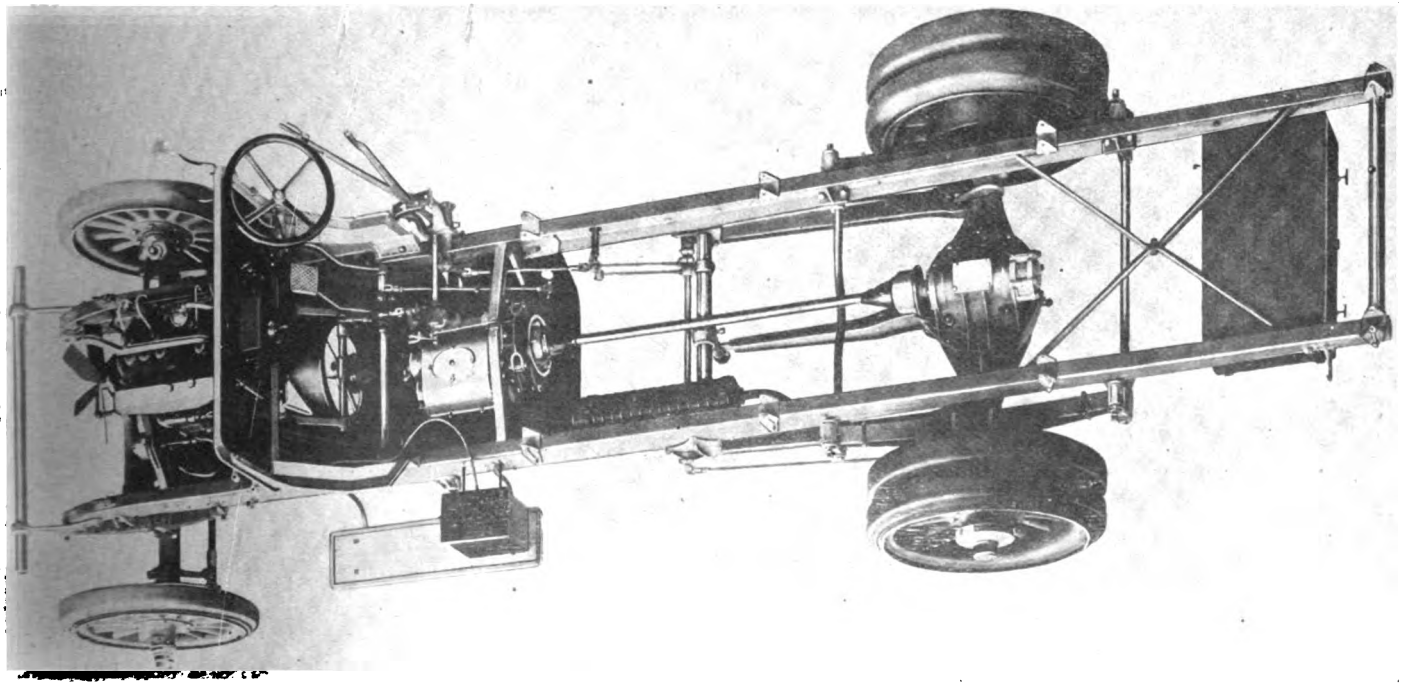
"Suspension of motor and radiator on heavy spiral springs—long life.

"Detachable hubs on wheels allowing quick change of seasonal equipment.

Pope Hartford 3-ton motor wagon.



Pierce-Arrow 5-ton power wagon.



Chassis of the Pierce-Arrow 5-ton truck, showing absence of gusset pl ates, a potent factor in the flexibility of the frame construction.

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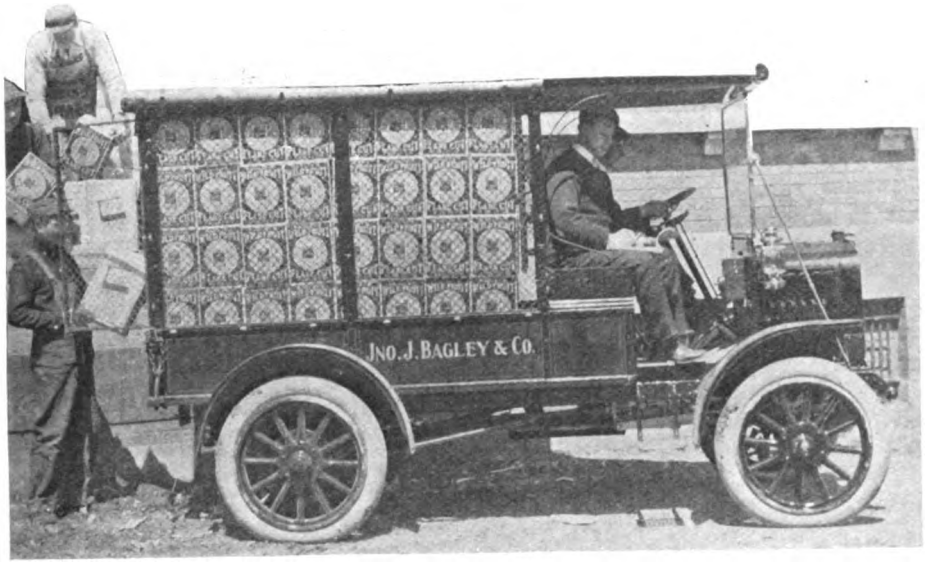
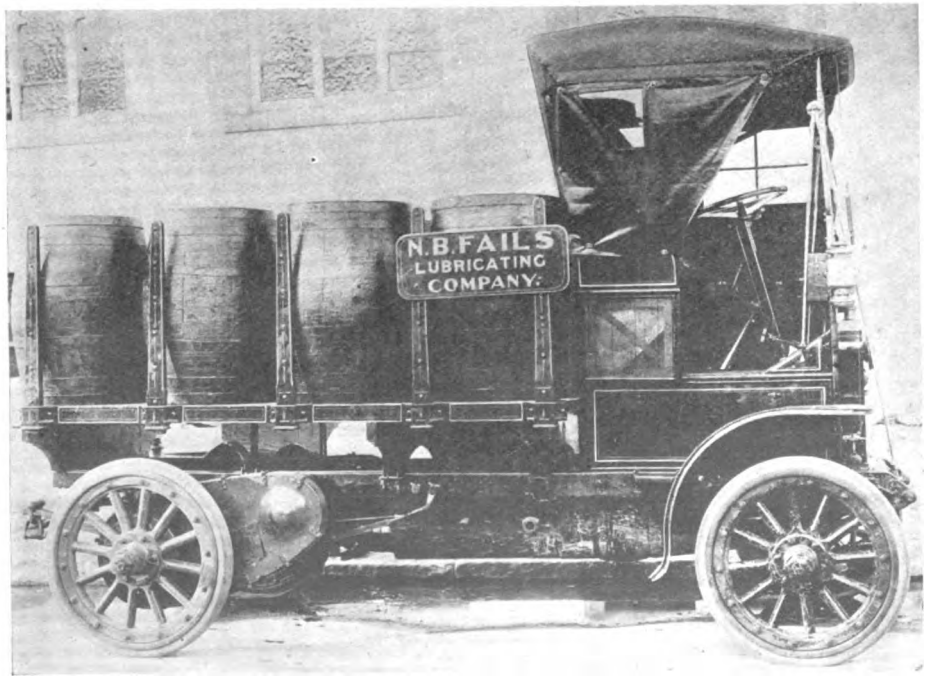
Sampson 4-ton model.

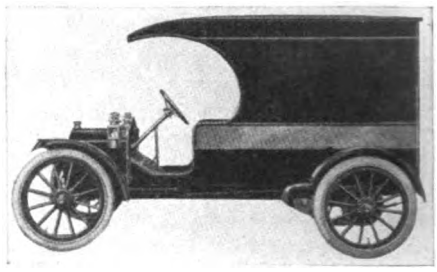


Sampson 1,000-pound delivery wagon with screen body.



Sampson 3,000-pound model.

Monitor 1-ton motor wagon.



Motor Wagon Co. of Detroit.

"All gearing and bearing surfaces dust and moisture proof.

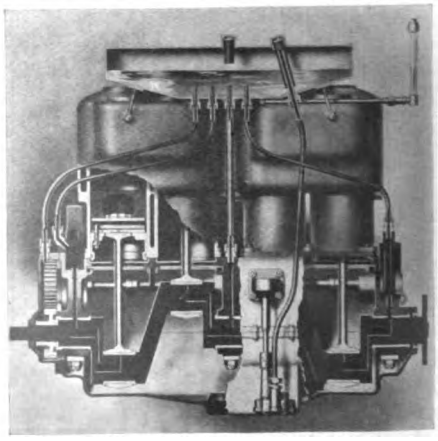
"Fish-belly frames, preventing sag—long life.

"Gear change and differential units mounted on three-point suspension—long life.

"Rear spiral auxiliary springs—minimize vibration; long life.

"Unusually large bearings—long life; economy.

Poss motor wagon.



Oiling system of Pierce-Arrow 5-ton truck motor.

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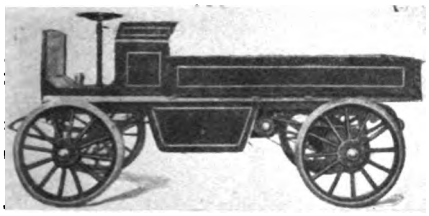
Sanford-Herbert motor wagon.



Schmidt motor wagon.

"Brakes quick-acting and powerful—safety."

Details of design are fully given in the specification tables in this issue.

* * *

Sanford-Herbert Co., Syracuse, N. Y.

This company makes the "Sanbert" gasoline motor wagon, 2,000 pounds capacity. All parts are standardized and interchangeable. The machines are warranted for 90 days, excepting tires, rims and chains, which are not guaranteed.

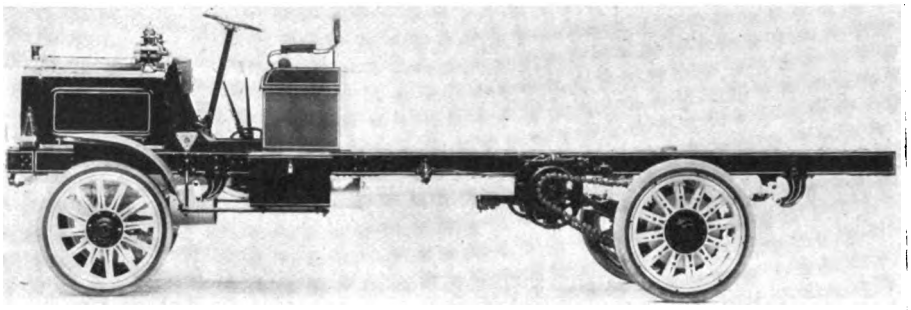
Details of design are fully given in the specification tables in this issue.

* * *

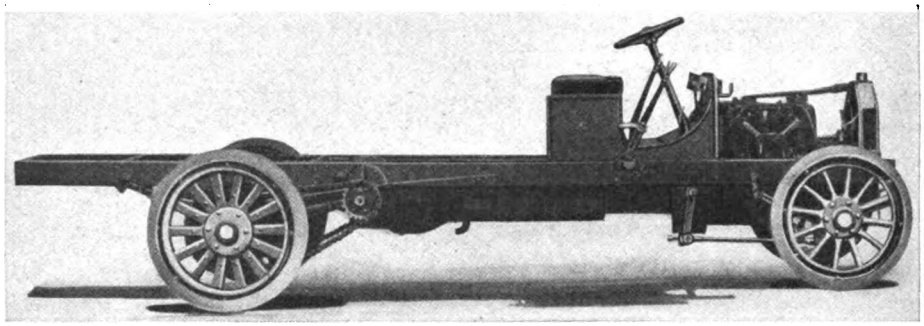
Schacht Motor Car Co., Cincinnati.

This company specializes in heavy duty gasoline motor wagons, of 2, 3 and 4-ton rated capacities. Bodies, which are optional, include open, stake and omnibus types.

The Schacht company also makes a 1,-

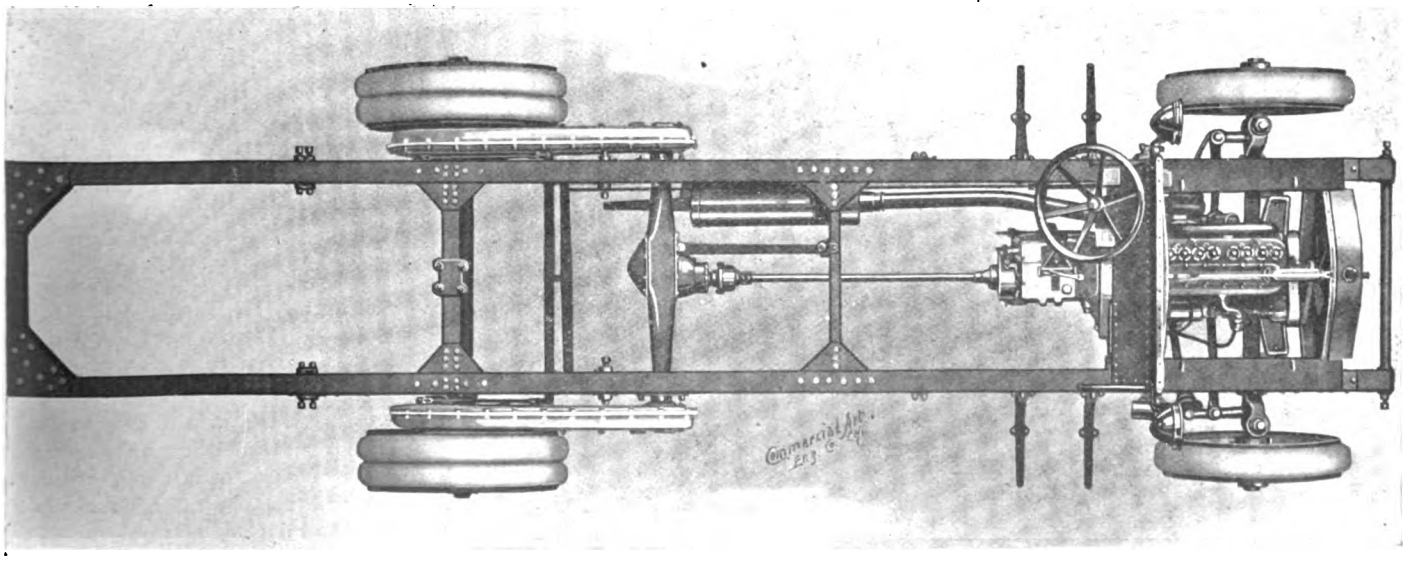


Packard 3-ton chassis.



Chassis of Peerless power wagon.

Schacht motor wagon.



Plan of chassis of Stegeman 3-ton power wagon

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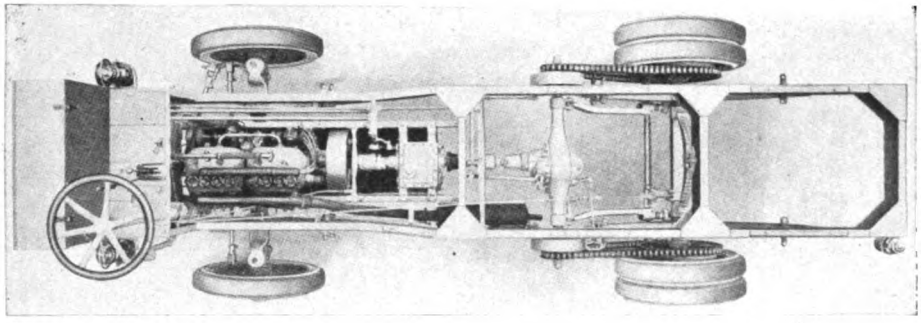
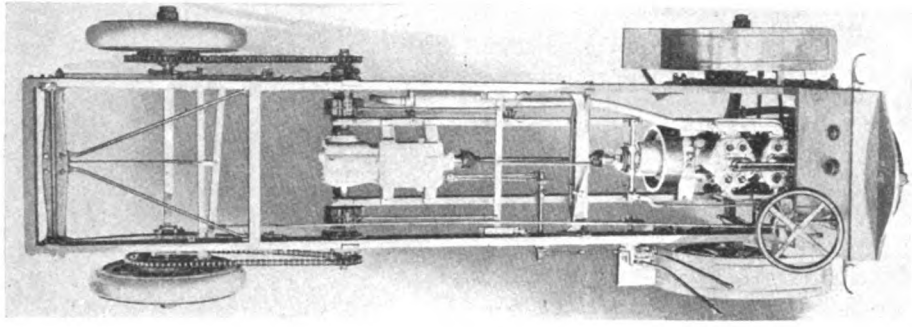
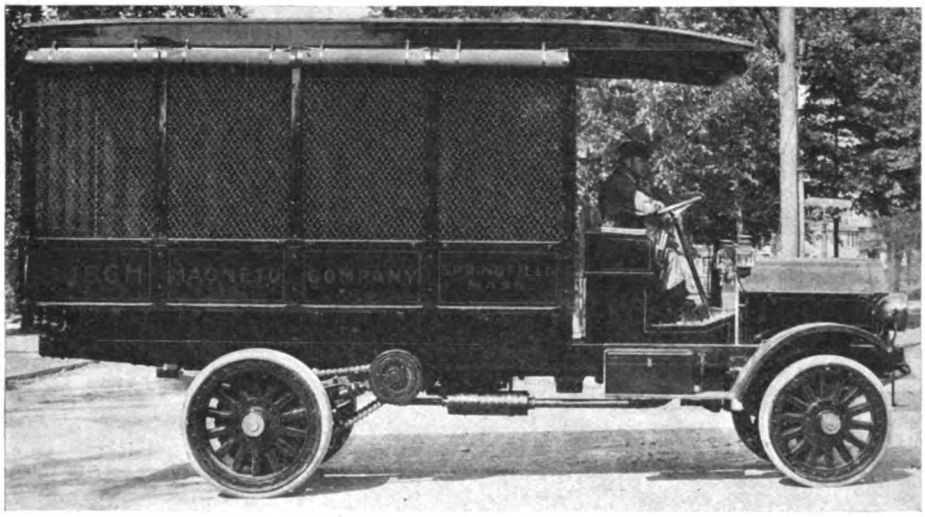


Speedwell 4-ton truck chassis.

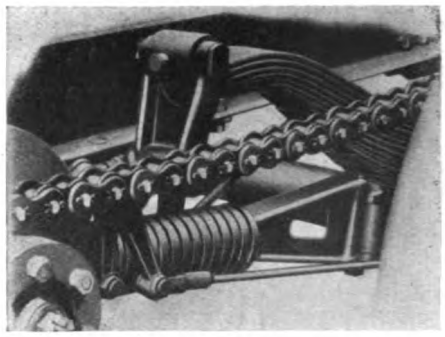


Sternberg 2-ton 4-cylinder chassis.



Stearns 5-ton motor wagon.

Universal 3-ton motor truck.



Spring strut rod and outside spring suspension of Velie motor truck.

500-pound delivery van on a touring car chassis.

Details of design are fully given in the specification tables in this issue.

* * *

Schmidt Bros. Co., Chicago.

This concern makes gasoline motor wagons of 1,500 and 2,000 pounds load capacities.

Details of design are fully given in the specification tables in this issue.

* * *

A. O. Smith Co., Milwaukee.

This company manufactures a 3-ton heavy duty gasoline motor wagon, full particulars of which are given on other pages of this issue.

Details of design are fully given in the specification tables in this issue.

* * *

Speedwell Motor Car Co., Dayton, O.

This concern makes 4 and 6 ton capacity gasoline motor wagons, besides motor patrols and motor ambulances.

Many special bodies are made to fit these chasses, including a coal dump body with two chutes.

The 4 ton machine, the standard wheelbase for which is 115 inches, is also made with a long wheelbase of 139 inches.

A power winch driven off the countershaft of the transmission is also provided by the company for attachment to its models, when desired.

Details of chassis design are fully given in the specification tables in this issue.

* * *

F. B. Stearns Co., Cleveland, O.

This concern makes a 5 ton gasoline motor wagon. Among its special features is the carrying of the power plant and the driver's seat on a sub-frame hung on semi-elliptic springs, thus taking all the road strains away from the motor.

Details of design are fully given in the specification tables in this issue.

* * *

Stegeman Motor Car Co., Milwaukee.

This company makes a very full line of gasoline motor wagons of from 1 to 6 tons load capacities.

According to the manufacturers:

"The extreme simplicity of our control by the use of an automatic advance in the magneto and the placing of the throttle for foot control eliminates all mechanism on the steering post. This leaves the

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driver free with his hands to guide the car. We also combine in one foot pedal both the clutch and the service brake. Also note that our car is equipped with a left-hand drive, permitting immediate stepping to the sidewalk without getting out into the street. The inclosing of our chains is a feature of such importance that the German government has demanded it on all cars subsidized by the War Department for 1912. All of our operating parts of whatever nature are inclosed and run either in oil or grease. We employ a scheme of bronze bushings to take up wear and fit each one of these bushings with a grease cup. This not only keeps out the dirt, but localizes the wear on parts which can be readily replaced and with little expense. Our car is designed with a unit power plant, in which all mechanism is carried up ahead away from the severe racking of the rear end of the car. By having the weight on the front wheels light, we are able to use a light weight of springs, which gives the car easy riding quality, makes it easy in steering and prolongs the life of the power plant. Our motor is fitted with a governor, which limits the speed of our car."

Details of design are fully given in the specification tables in this issue.

* * *

Sternberg Mfg. Co., Milwaukee.

This concern makes a complete line of gasoline motor wagons of load capacities, as follows: One to 1½ tons, 2 tons, 3½ to 4 tons, 5 to 6 tons.

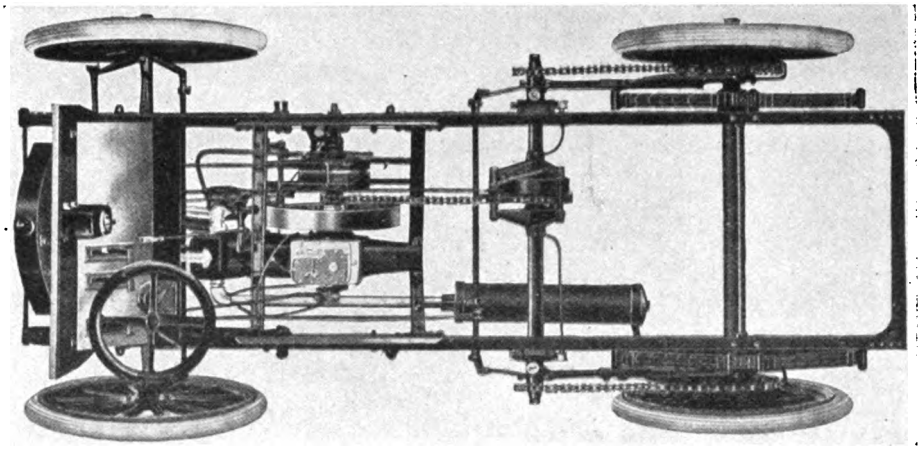
Details of design are fully given in the specification tables in this issue.

* * *

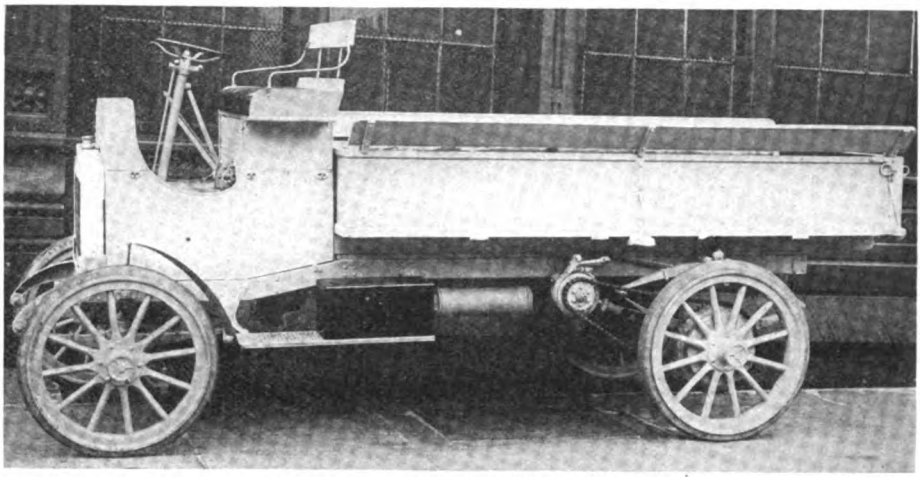
Universal Motor Truck Co., Detroit.

This concern specializes in a 3-ton gasoline motor wagon. The motor flywheel comprises a Sirocco type of fan, for cooling purposes. The makers assert of their motor wagon: "No pleasure car traditions, no pleasure car equipment, no pleasure car practices have entered into or hampered the design."

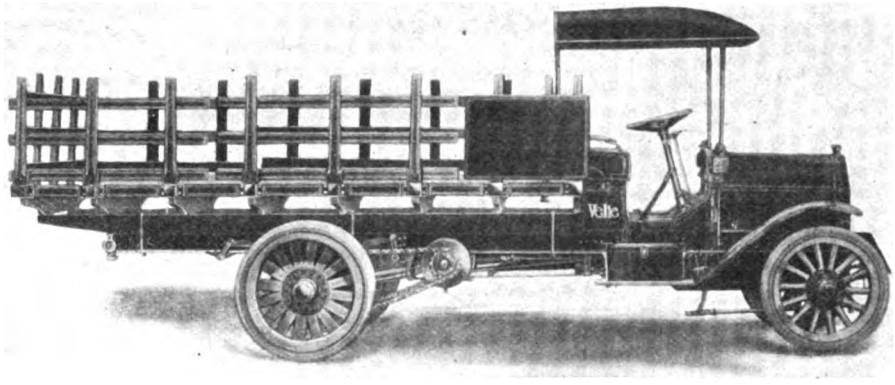
Details of design are fully given in the specification tables in this issue.



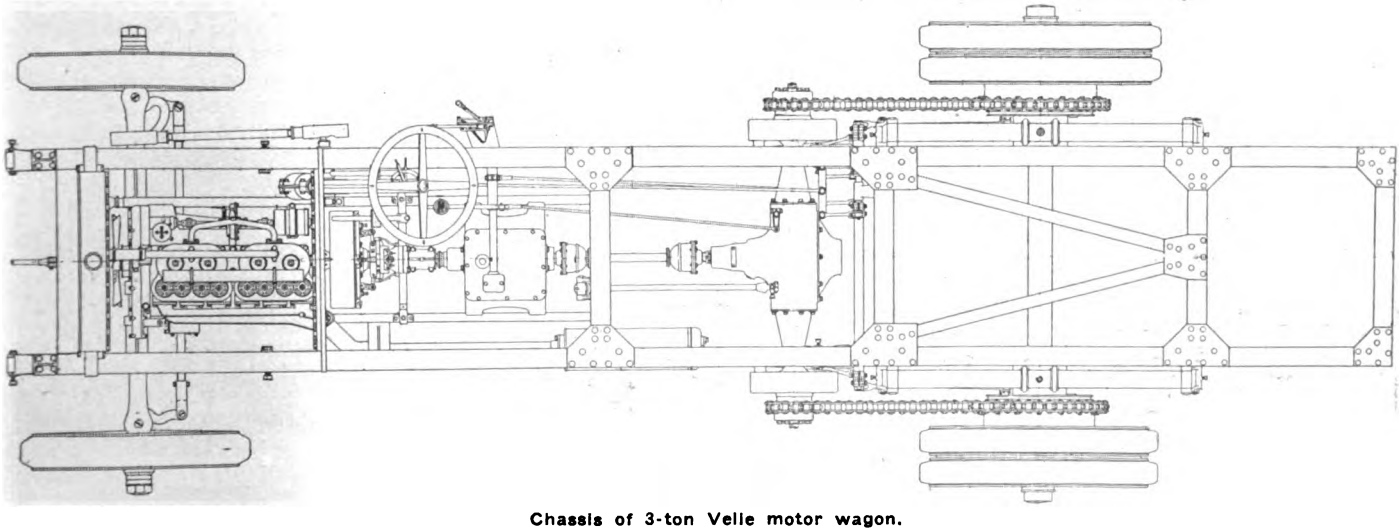
Reo motor wagon chassis.



U. S. Motor Truck Company's 1½-ton model.



Velie 3-ton motor truck with standard stake body.



Chassis of 3-ton Velie motor wagon.

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U. S. Motor Truck Co., Cincinnati.

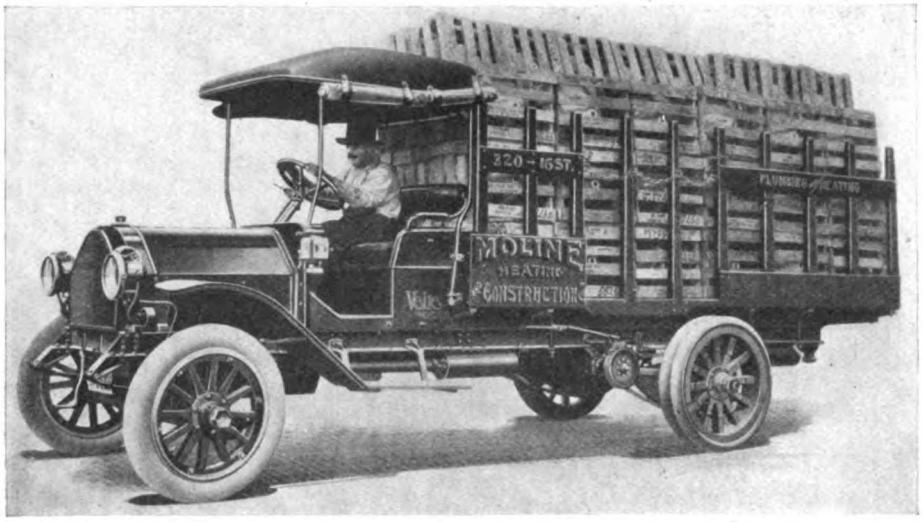
This concern makes 1½ and 3 ton gasoline wagons, using straight-line drive from the motor to the differential and a transmission with gears always in mesh.

Details of design are fully given in the specification tables in this issue.

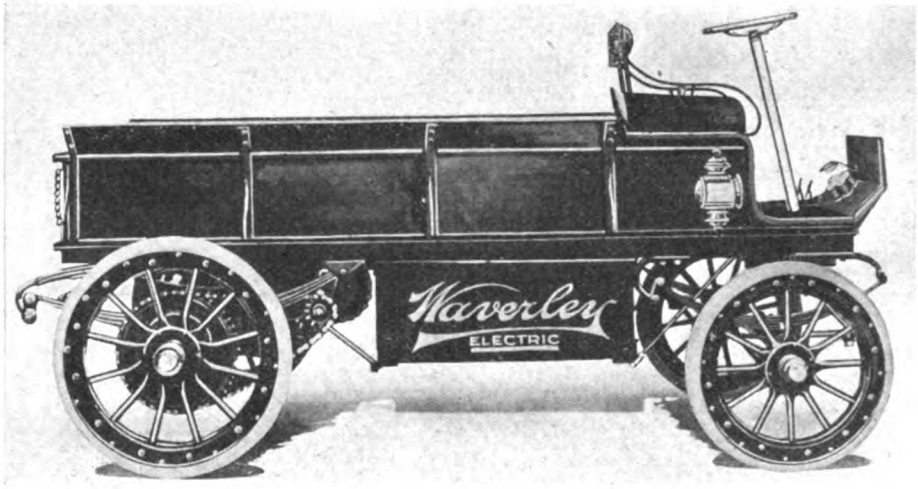
Velie Motor Vehicle Co., Moline, Ill.

This concern, having recently made its entry into the motor wagon field after much careful preparation, announces that its line for 1912 is complete. The company advises as follows: "We are building a 3-ton model of ordinary 5-ton dimensions, but at a 3-ton price. We have increased the specifications of our former 1½-ton model and have changed its rating to 2 tons at the former price. We have added the 1,500 pound box delivery wagon type at $1,600, and an inclosed or panel type package delivery wagon at $1,800. The new type of box delivery wagon as developed is equipped with individual artillery, folding seats, which will permit the driver of folding down the left hand seat so that in case he has a load of pipe or lumber of unusual length, it can be extended beyond the seat even as far forward as the radiator of the car if necessary. This is a very novel feature for a light delivery wagon.

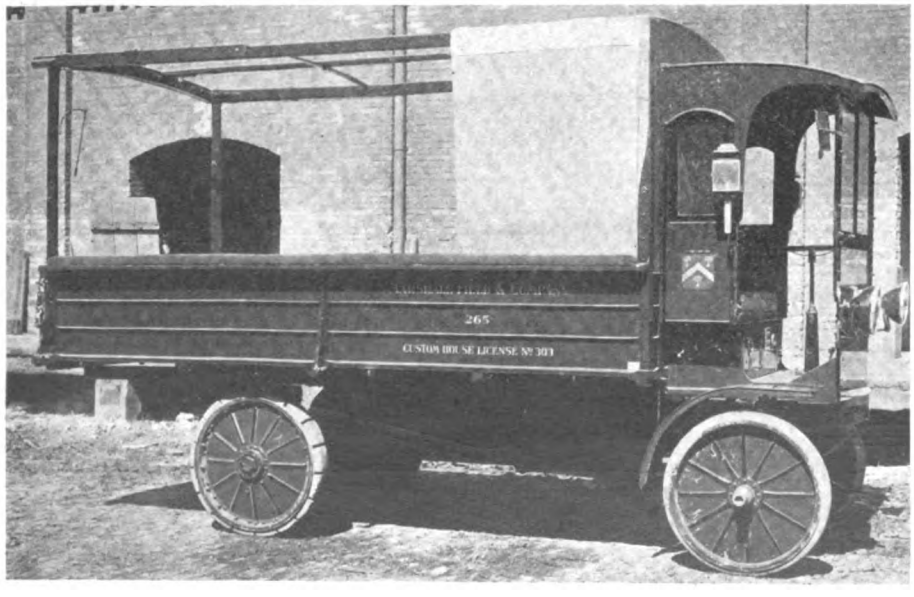
Details of design are fully given in the specification tables in this issue.



Velie 1½ motor truck with stake body.



Waverley model 80 open delivery electric wagon.



Walker Model D.

* * *

Walker Vehicle Co., Chicago.

This concern makes the "Walker balance drive" electric wagons. Load ratings are: 750 to 1,000, 1,500 to 2,000, 3,000 to 4,000, 4,000 to 5,000, and 6,000 to 7,000, pounds. The makers claim that "the Walker balance drive makes it entirely practical and economical to vary the type and size of bodies to best suit the particular requirements of each user's service, and at the same time produce vehicles which are better proportioned throughout than is possible with chain or shaft-driven vehicles." This drive has already been described in our columns.

Details of design are fully given in the specification tables in this issue.

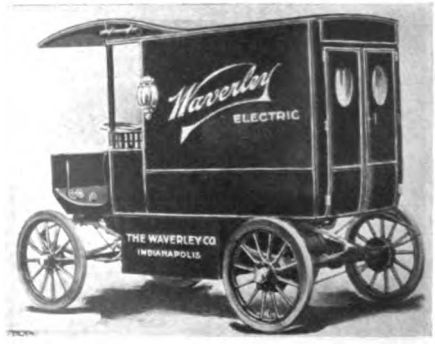
* * *

The Waverley Co., Indianapolis.

This company makes a very complete line of electric power wagons of load ratings, as follows: 600, 1,500, 2,000, 2,500, 4,000, 6,000, 7,000 and 10,000 pounds.

The show exhibits comprise a 3-ton chassis, a 2,500-pound chassis and a 600-pound delivery wagon, built for Eli Lilly & Co. of Indianapolis.

The 3-ton chassis has a wheel base of 118 inches, gauge 73 inches, width loading space 4 feet 6 inches and length back of driver's seat 13 feet. It is operated by 42 cells 19 MV Hycap battery, supplying current to two series-wound Waverley 80-



Waverley 600-pound model.

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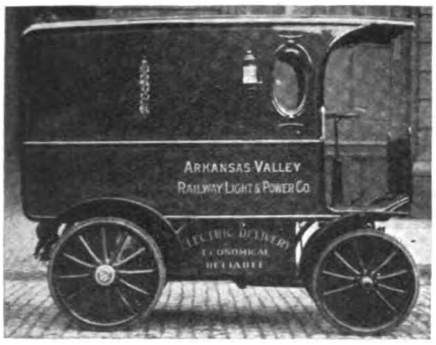

Walker electric with panel top.

volt motors. The tires are 36 by 5 front and 36 by 3½ dual rear. This chassis is rated at a speed of 9 miles per hour loaded, with a mileage of 35 miles on one charge. The frame is made of channel steel, 5-inch channel; the members are hot-riveted throughout and fitted with heavy gusset plates. The axles are drop-forged alloy steel, the wheel pivots being ground and fitted with Timken roller bearings. Primary drive chains are inclosed in metal cases fitted with hand plates that may be removed when desired. The front springs are semi-elliptic, while in the rear the platform type is used. There are two sets of brakes, one on the rear wheels and the other on the countershaft, both foot operated. The Waverley controller is of the continuous torque knife-blade type, located under the driver's seat, fitted to vertical lever.

The 86-A chassis, with a carrying capacity of 2,500 pounds, has 100-inch wheel base, gauge 56 ins. by 8½ ft. It is operated by 42 cells, 13 plate Waverley battery, supplying current to one series-wound, 90-volt Waverley motor. The frame material is armored wood. The speed of this chassis loaded is 12 miles per hour, with a mileage on hard level roads 45 miles on one charge. The drive is from the motor to the countershaft, through a Renold silent chain inclosed in an oil-proof case, which is designed to take up adjustments on the chain. The drive from the countershaft to the rear wheels is through roller chains.

The complete model 83, 600-pound delivery wagon built for Eli Lilly & Co. of Indianapolis, has a wheel base of 87 inches, gauge 54 inches, width loading space 3 feet, length back of driver's seat 4 feet and height 4 feet. The battery is of 28 cells 13 MV Hycap; 60-volt, 35 amperes Waverley motor, series-wound high torque. This car is operated through the Waverley high efficiency shaft drive, similar to that used on Waverley pleasure cars, noted for their 98.7 per cent efficiency and absolute noiselessness. The body is of handsome design, with metal screens on the sides, giving it unusual lightness.

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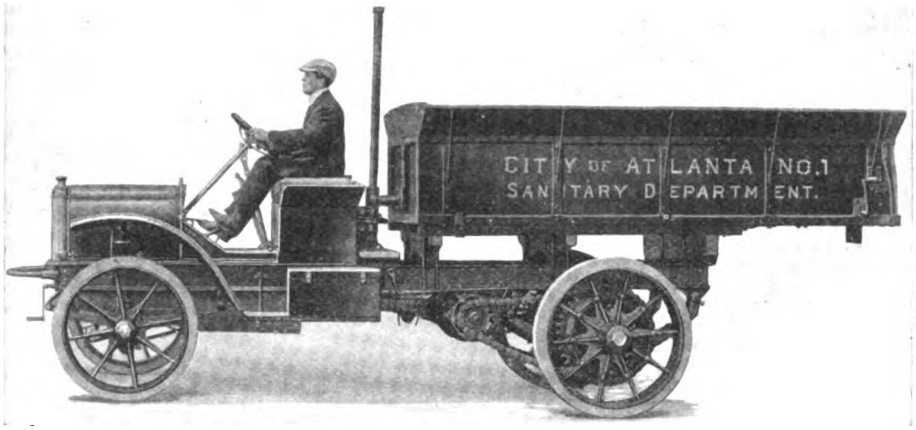
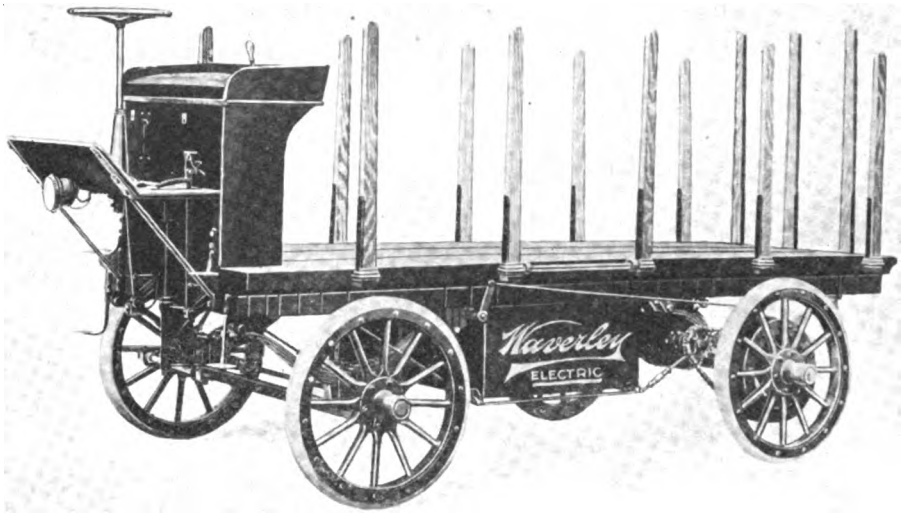
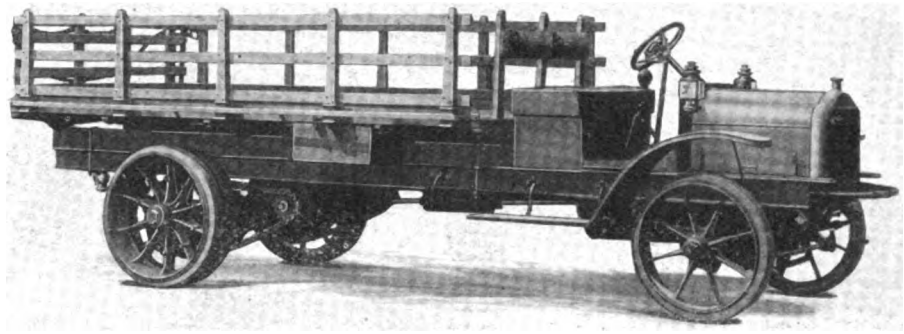
Details of design are fully given in the specification tables in this issue.



White garbage truck.



Waverley 2500-pound electric wagon.



White 5-ton power wagon with standard platform body.

Wilcox 1½-ton Model K.

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White Company, Cleveland.

This company makes gasoline motor wagons of 1,500 pounds, 1½ tons and 3 tons capacity. Simplicity of motor and accessibility of parts are the chief features.

* * *

H. E. Wilcox Motor Car Co., Minneapolis.

This concern makes gasoline motor wagons in 1, 1½ and 3 ton sizes. The power equipment is practically the same on all three models, the chief differences being the use of strong materials and lower speeds on the heavy machines.

Details of design are fully given in the specification tables in this issue.

* * *

Wyckoff, Church & Partridge, Inc., N. Y.

This concern manufactures the "Commer" motor wagons, of 4½ and 6½ tons capacities. These machines are now being made in America in exact duplication of the British "Commers" and of the same materials as far as possible. The necessary jigs, dies and tools were specially imported from Luton, England, for this purpose.

INVENTS NEW MOTOR WAGON.

A power wagon said to be especially adapted to army use has been invented by C. H. Cook, an engineer of Omaha, Neb. One of the features of this new machine is the four wheel drive, the power being furnished by one motor and conveyed to each wheel by the use of a peculiar universal joint. Also the rear wheels can be sterred independently of the front wheels, thus allowing the vehicle to turn in a small space or swing up to any desired point quickly.

POWER WAGONS MAKE GOOD.

Two power wagons placed in service by Indianapolis last spring have effected such economies in the city engineering department, where they are used, that three additional machines will be purchased in the spring.

The city reports that the two motor wagons have performed the work of three horse drawn vehicles, thus saving not only the expense of an additional vehicle and its maintenance, but the salary of an extra corps of men as well. The actual cost of operating the two machines since March 1, including gasoline and all repairs, but excluding drivers' salaries, has been $12.50 a month. The city is now paying $20 a month per head for feeding horses at livery stables.

MOTOR GARBAGE COLLECTION.

Garbage in the down town and hotel district of Los Angeles, Cal., will hereafter be collected by motor wagons. It is estimated that the city will save $39.28 per night by this innovation.

MOTOR SAFE FOR GLASS HAULAGE.

An Ohio firm that deals in plate glass on a large scale recently purchased a 2 ton power wagon to transport its product from the warehouse to the freight yards. It is stated by the owners that although $50,000 worth of plate glass is handled by this machine every week, not a single dollar's worth has been broken, and this in spite of the fact that an inexperienced driver has charge of the machine.

Company of police in armored motor wagon, and battalion of Scots Greys, escorting prisoners to Walton jail during the recent strike in Liverpool, England.

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Maker	Normal Load Rating	Maker of front axle	Shape and dimensions of front axle	Nature of material of front axle	Ground clearance, front axle	Maker of rear axle	Sectional shape and dimensions of rear axle	Nature of material of rear axle	Ground clearance rear axle (in.)	Normal road speed (m. p. h.)	Maximum road speed (m. p. h.)	Material and section of frame	Percentage wgt. of chassis on rear axle	Percentage wgt. of loaded truck on rear axle	Dimension (in.) of platform	Platform height, empty (in.)	Platform height, loaded (in.)	Percentage overload capacity
Auglaise M. C. Co		Sheldon	1¼x1¼	S.	14	Sheldon	1¼x1¼	S.	16	12	15	S.	60	75	95x48	.....	.....	25
Bessemer M. T. Co	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buckeye Mfg. Co	1	Liggett	.....	S.	15	Lambert	1½x1½	S.	16	.....	18	S.	.....	.....	.....	34	.....	.....
Byron Motor Co	1	Timken	I	N. S.	9	Timken	P. S.	.....	10	20	.....	P. S.	60	.....	.....	.....	34	50
B. F. Board M. T Co	1	Sheldon	I	S.	9	Sheldon	.....	.....	10	15	25	C. S.	75	75	78x48	37	.....	50
Brush Runabout Co		Own	Solid	.....	10	Own	Solid	.....	10	.....	28	Wood	.....	.....	51x37½	.....	.....	.....
Brooks Latta A. M. Co	1	.....	I	.....	12	.....	.....	P. S.	12	18	40	P. S.	.....	.....	.....	.....	.....	.....
Brooks Motor Wagon		Own	2x1½	C. S.	18	Own	1½x1½	C. S.	20	15	20	C. S.	60	80	72x36	36	34	33
Cameron Car Co		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cameron Car Co		Own	2 tub'lar	S.	.....	Own	1 3/16dia.	S.	11	35	45	P. S.	.....	.....	.....	.....	.....	.....
Commerce M. C. Co	1	W. Mott	Tubular	.....	12	W. Mot.	Tubular	S.	.....	18	25	P. S.	50	66	64x42	27½	25½	50
Dispatch M. C. Co		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dispatch M. C. Co	1	Own	2x1½ clr.	N. S.	15	Own	2x1½ clr	N. S.	15	20	40	Oak	.....	66	12 sq.ft	28	24	33
Flint M. W. Dept. (Durant Dort)		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ford Motor Co		Own	2x1½ clr.	N. S.	15	Own	2x1½ clr.	N. S.	15	20	40	Oak	.....	66	20 sq.ft.	28	24	30
F. S. Motor Co		.....	1¼x1½	S.	13	.....	1¼x1½	S.	17	10	18	S. S.	50	60	63x40	31	28	50
Geneva Wagon Co	1	Ford	.....	.....	.....	Ford	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Herreshoff Motor Co		WestonMott	I	.....	12	WestonMott	I	.....	.....	15	15	P. S	.....	.....	.....	.....	.....	.....
Hatfield Co	1	.....	1½x1½	S.	13	.....	1½x1½	S.	13	15	18	Wood	.....	.....	58x45	28	26	.....
Ideal Com. Car Co	1	Own	I 2x1¼	S.	9½	Own	Tube	.....	9½	20	35	C. S.	40	65	72x48	45	41	33
International Harvester Co	1	Own	I 3 n.	S.	12	Own	2½ Rn'd	S.	15	20	.....	A. I.	.....	.....	67x42	34	.....	100
Imperial Wheel Co		Salisbury	I	S.	10	Salisbury	Tube	S.	8	18	23	C. S.	50	75	78x43	29	.....	50
W. Landshaft & Son	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lincoln M. C. Works		.....	1¼x1½	.....	11½	.....	1¼x1¼	.....	16½	.....	15	S.	40	60	60x40	31	.....	.....
Mercury Mfg. Co	1	Sheldon	1¼ coac'd	S.	15	Sheldon	1¼ C'h'	S.	17	15	20	C. S.	.....	75	84x40	37	35	50
Motor Wagon Co		Sheldon	Square	S.	13	Sheldon	Square	S.	13	15	20	C. P. S.	65	65	72x38	40	36	25
W. H. McIntyre Co		.....	Rect.	.....	18	.....	Rect.	N. S.	19	15	15	Comp.	50	50	72x40	32	29	None
W. H. McIntyre Co		.....	Tubular	.....	11	.....	Square	.....	.....	15	15	.....	.....	.....	.....	.....	.....	.....
Newark A. Mfg. Co	1	Own	1¼x1¼	S.	.....	Own	1¼x1¼	S.	.....	15	15	A. S.	.....	.....	.....	.....	.....	.....
Pratt, Carter, Sigsbee Co		Own	1¼x1¼	S.	.....	Own	.....	S.	.....	15	15	P. S.	.....	.....	.....	.....	.....	.....
Poss Motor Co	1	Sheldon	I	S.	11	Sheldon	.....	.....	11	25	35	C. S.	40	60	66x44	32	29	50
Regal M. C. Co	1	Timken	I 1½	S.	10	Own	2½ tube	N. S.	10½	16	24	C. S.	.....	65	64x34	32	30	50
Sullivan M. C. Co		Weston Mott	Tub.	S.	11	Weston M't.	2½ tube	S.	11	15	20	S.	50	60	66x39	34	32	50
Staver Cge Co	1	I	I	S.	11	.....	.....	.....	10	15-20	35	C. S.	.....	.....	56x39	.....	.....	.....
Warren M. C. Co	1	Sheldon	1¼x1¼	.....	16	Sheldon	1¼x1¼	.....	16	15	18	A. S.	40	60	60x38	30	27	.....
		Greenville	I	S.	.....	Salisbury	.....	.....	.....	.....	50	.....	.....	.....	.....	.....	.....	50
		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* With body. † Valveless.

A.—Artillery. Exp.—Expanding. F. wood. S.—Steel. S. W. & N.—Worm and ... W. W.—Double irreversible worm. D. S. E.—Double semi-elliptic. D. S.—Differential screw. Double screw. E.—Elliptic. r axle. R. C. S.—Rolled channel steel. R. H.—Rear hubs. R. & P.—Rack and pinion. R. W.—Rear wheels. Reinforced eat. V. or Vert.—Vertical. V. in H.—Valve in head. V. S.—Vanadium steel. W.—Worm. W. & G.—Worm and gear.

Maker	Normal Load Rating	Maker of front axle	Shape and dimensions of front axle	Nature of material of front axle	Ground clearance, front axle	Maker of rear axle	Sectional shape and dimensions of rear axle	Nature of material of rear axle	Ground clearance rear axle (in.)	Normal road speed (m. p. h.)	Maximum road speed (m. p. h.)	Material and section of frame	Percentage wgt. of chassis on rear axle	Percentage wgt. of loaded truck on rear axle	Dimension (in.) of platform	Platform height, empty (in.)	Platform height, loaded (in.)	Percentage overload capacity
Alden Sampson Mfg. Co	1500	.....	Rect.	.....	11	.....	.....	.....	12	20	.....	P. S.	.....	66	72x43	32	30	.....
Atlas M. C. Co	1500	Timken	I	S.	9	Own	Square	S.	9	20	30	P. S.	.....	.....	84x60	36	.....	33
Automobile Mfg. & E. Co	1500	Sheldon	I	S.	.....	Sheldon	.....	S.	.....	35	55	P. S.	.....	.....	.....	.....	.....	.....
Bartholomew Co	1500	Own	I	.....	11½	Own	.....	.....	11½	25	55	C. P. S.	.....	.....	.....	.....	.....	50
H. H. Babcock Co	1500	Salisbury	I 2¼x1½	S.	11	Salisbury	Tubul'r	S.	14	12	15	C. N. S.	50	75	96x48	36	32	None
Buick Motor Co	1500	Own	I1¼x2¼	S.	10½	Own	I1¼x2¼	S.	10½	15	20	A. I.	33	75	88x62	40	34	33
Cartercar Co	1500	Greenville	Tube	S.	11	Greenville	T. 2½ d.	S.	16	15	22	Angle S.	25	60	74x44	35	34	.....
Chase M. T. Co	1500	.....	Square	S.	.....	.....	Square	S.	.....	10	15	A. & A.	.....	.....	.....	.....	.....	.....
Coleman C. & H. Co	1200	Sheldon	Square	S.	13	Sheldon	1¼x1¼	S.	20	15	20	A. S.	50	66	84x42	36	32	33
Chicago Pneumatic Tool	1500	Sheldon	1½x2	S.	16	Sheldon	2x2	S.	17	15	.....	Angle	53	63	90x44½	35	32½	33
Denniston Co	1500	Sheldon	I	.....	10¾	Own	.....	V. S.	7	15.8	22	P. S.	.....	50	84x48	36¾	.....	None
Dorris M. C. Co	1500	Timken	I 2 in.	S.	11	Timken	Tub 2½	P. S.	11	.....	.....	P. S.	33	66	70x46	.....	.....	.....
F. S. Motors Co	1500	Petrel	1¼ dia.	.....	12	Petrel	1¼ dia.	.....	10½	15	30	P. S.	.....	.....	.....	.....	.....	.....
Huron River Mfg. Co	1500	Liggett	I 1½x2	.....	13	Ligget	I 1½x2	.....	15½	15	20	P. S.	55	60	72x34	.....	.....	33
Ideal Auto Co	1500	Sheldon	1½x2	S.	16	Sheldon	2x2	S.	16	15	20	W. & S.	40	60	102x44	31	.....	None
Kearns M. C. Co	1500	Sheldon	1½x1½	S.	14	Sheldon	1½x1½	S.	14	18	20	W. &SA	.....	.....	96x42	16	.....	20
Kissel M. C. Co	1500	.....	I	S.	.....	.....	.....	.....	.....	.....	30	P. S.	.....	.....	81½x44	.....	.....	.....
Lippard-Stewart M. C. Co	1500	Timken	I 2½x2¾	S.	9½	Timken	.....	P. S.	9½	25	25	C .N. S.	50	65	78x48	30	27½	.....
Mora P. W. Co	1500	.....	1½x1½	S.	13¼	.....	1½x1½	S.	16½	15	20	C. P. S.	.....	.....	80x45	36	34	25
W. H. McIntyre Co	1500	Own	1½x1½	S.	.....	Own	1½x1½	S.	.....	15	15	C. S.	.....	.....	.....	.....	.....	.....
W. H. McIntyre Co	1500	Own	1½x1½	S.	.....	Own	1½x1½	S.	.....	15	15	C. S.	.....	.....	.....	.....	.....	.....
Monitor Auto. Works	1500	Own	I	S.	8	Own	.....	.....	.....	15	20	P. S.	40	60	86x44	36	33	25
Newark Auto Co	1500	Sheldon	I	S.	11	Sheldon	.....	.....	11	25	35	C.C.N.S.	40	60	66x44	32	29	50
Oliver M. C. Co	1500	Own	I	S.	12	O. M. C. Co	.....	P. S.	10	15	24	P. S.	45	85	72x44	38	35	33
Reo M. T. Co	1500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rowe Motor Co	1500	.....	I	S.	12	.....	Tub'lar	S.	12	20	25	S.	70	80	87x44	.....	.....	.....
Schmidt Bros	1500	Sheldon	Square	S.	17	Sheldon	Square	S.	18	18	22	C. S.	.....	75	90x44	36	33	.....
Siebert M. W. Co	1250	Sheldon	1½x2	S.	.....	Sheldon	1½x1½	.....	.....	15	20	A. S.	.....	.....	.....	.....	.....	.....
Sullivan M. C. Co	1500	Sheldon	1½x1½	S.	16	Sheldon	1½x1½	S.	16	15	18	A. S.	40	60	72x44	32	28	.....
Veerac Motor Co	1500	Sheldon	Truss'd	S.	12	Sheldon	1½x1½	S.	17	15	18	Wood-	40	50	88x47	34	31	20
Victor M. C. Co	1500	.....	1½x3½	S.	.....	.....	1½x1½	S.	.....	.....	.....	C. S.	.....	.....	84x42	.....	.....	.....
Whitesides Com. Car Co	1500	Liggett	I2½x2½	S.	14	Liggett	I2½x2½	S.	17	15	20	A. S.	45	75	Opt.	Opt.	.....	20
Wichita Falls M. Co	1200	Sheldon	1½x2½ I	S.	10	Sheldon	2x2	S.	16	20	25	C. S.	40	60	90x45	36	33	50

A.—Artillery. Exp.—Expanding. F. wood. S.—Steel. S. W. & N.—Worm and ... W. W.—Double irreversible worm. D. S. E.—Double semi-elliptic. D. S.—Differential screw. Double screw. E.—Elliptic. r axle. R. C. S.—Rolled channel steel. R. H.—Rear hubs. R. & P.—Rack and pinion. R. W.—Rear wheels. Reinforced eat. V. or Vert.—Vertical. V. in H.—Valve in head. V. S.—Vanadium steel. W.—Worm. W. & G.—Worm and gear.

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Maker	Maker of front axle	Shape and dimensions of front axle	Nature of material of front axle	Ground clearance, front axle	Maker of rear axle	Sectional shape and dimensions of rear axle	Nature of material of rear axle	Ground clearance rear axle (in.)	Normal road speed (m. p. h.)	Maximum road speed (m. p. h.)	Material and section of frame	Percentage wgt. of chassis on rear axle	Percentage wgt. of loaded truck on rear axle	Dimension (in.) of platform	Platform height, empty (in.)	Platform height, loaded (in.)	Percentage overload capacity
Abresch-Cramer A. T. Co.																	50
Adams Bros.																	
Atterbury M. C. Co.																	
Beck & Son	Sheldon	I	S.	10	Sheldon	Square			15		C. P. S.		65	106x46	38		50
Bessemer M. T. Co.	Sheldon	I 2½	S.	14	Sheldon	2½ dia.	S.	16	18	18	P. S.	50	75	96x48	43	41	None
Bessemer M. T. Co.	Sheldon	1½x1½	S.	16	Sheldon	Square	S.	18	10	15	C. C. S.						
B. F. Board M. T. Co.																	
Buckeye Mfg. Co.																	
Byron Motor Co.	Sheldon	I	S.	9	Sheldon	I½x2½	S.	10	15	25	C. S.	66	75	96x48	39		50
Cameron Car Co.	Liggett	I	S.	11½	Liggett	2½x1½ I	S.	16½		15	C. S.				41		
Chase M. T. Co.	Timken	I	N. S.	10	Timken	I.		14	18		C. S.	30	60			34	50
Chase M. T. Co.	Sheldon	Square	S.	17	Sheldon	Square	S.	17	20	30	P. S.	50	65	102x48		35	
Federal M. T. Co.		Square	S.			Square	S.		10	15	R. W.						
H. H. Franklin Mfg. Co.		Square	S.			Square	S.		10	15	R. W.						
General M. T. Co.	Own	I	S.	11	Own	2x2	S.	17	15	15	P. S.	60	73	102x66			50
General Motors Co.	Own	2½ dia.	N. S.	10½	Own		N. S.	11½		21	Wood		76	96x60		42	
Grabowsky P. W. Co.	Own	I 2½x2½	S.		Own	2 7/16x1½	N. S.		15	15	C. S.			96x57		44	
Gramm M. T. Co.	Own	I	S.		Own	Round			14	14	C. S.		68				
Hatfield Co.		I	S.			I.	S.		20		P. S.						
Hewitt Motor Co.	Own	1½x1½	S.		Own	2½ dia.	S.			17	C. S.		60				
Huron River Mfg. Co.	Own	3 I	S.	12	Own	2½ dia.	S.	15	15		A. I.			84x48	34		100
Ideal Auto Co.																	
Kelly Motor Truck Co.	Liggett	I2x2½		14	Liggett	I2x2½		14	12	15	P. S.	50	65				25
Kissel M. C. Co.	Sheldon	1½x2½	S.	16	Sheldon	2½x2½	S.	16	12	18	Ash & S	40	60	90x44	33		None
Kopp M. T. Co.		I	N. S.	10		I	N. S.	16	18	22	P. S.			Opt.	34		50
W. Landshaft & Son.		I	S.							25	P. S.			96x60			
Lauth-Juergens M. C. Co.	Timken	I	S.	11	Timken						C. S.	66	66				
Lauth-Juergens M. C. Co.	Sheldon	1½x2	S.	15	Sheldon	2x2	S.	17	12	15	C. S.	33	75	108x40	37	35	25
‡Mack Bros. M. C. Co.	Sheldon	I 2½	S.	12	Sheldon	2½x2½	S.	14½	15	20	C. S.		80	120x48			25
Monitor Auto. Works.	Sheldon	I 2	S.	11	Sheldon	2x2	S.	13	15	18	A. S.		80	120x48			25
National M. T. Co.	Own	I 1½	N. S.	13	Own	1½x2½	N. S.	17	17	20	C.P.S.				36		50
Nelson & LeMoon.	Own	I	S.	10	Own				12	15	P. S.	40	60	86x44	36	33	25
W. H. McIntyre Co.	Own	Rect.	S.	12	Own	Rect.	N. S.	15½	14	17	C. P. S.	40	65	96x48	36	33	
W. H. McIntyre Co.	Sheldon	1½x2	N. S.	13	Sheldon	2½x2½	N. S.	16	18	25	C. S.	55	45	108x48	34	32	50
Randolph M. C. Co.	Sheldon	1½x1½	S.		Own	1½x1½	S.		15	15	C. S.						
Sanford-Herbert Co.	Sheldon	1½x1½	S.		Own	1½x1½	S.		15	15	C. S.						
Siebert M. W. Co.	Own	Tubular	S.	12	Own	1½x1½	N. S.	12	14	14	C. S.	51	62	96x46	41	38½	25
Stegeman M. C. Co.		I 2½x1½	S.	15		2x1½	S.	17	12	17	C. S.	25	55	108x48	35	33	50
Schmidt Bros Co.	Sheldon	1½x2½			Sheldon	2x2			14	22	C. P. S.						
Victor M. C. Co.		Rect.	S.	12		Square	C. N. S:			18	P. S.		92	96			25
Whitesides Com. Car Co.	Sheldon	Square	S.	17	Sheldon	Square	S	18	18	20	C. S.	50	75	90x44	36	33	25
Wichita Falls M. Co.	Timken	1½x2½	S.		Timken	1½x2½	S.				C. S.						
H. E. Wilcox M. C. Co.	Liggett	I2½x2½	S.	14	Liggett	I2½x2½	S.	17	14	20	A. S.	45	75	Opt.	Opt.		20
	Sheldon	1½x2½	S.	10	Sheldon	2½x2½	S.	16	14	17	C. S.	30	80	103x62	42	38	50
	Timken	I	S.	16	Timken	Round	S.	15	18		C. S.	50	60	Opt			

‡ International Motor Co., Dis

A.—Artillery
Exp.—Expanding.
wood. S.—Steel.
W. & N.—Worm

V.—Double irreversible worm. D. S. E.—Double semi-elliptic. D. S.—Differential screw. Double screw. E.—Elliptic.
kle. R. C. S.—Rolled channel steel. R. H.—Rear hubs. R. & P.—Rack and pinion. R. W.—Rear wheels. Reinforced
V. or Vert.—Vertical. V. in H.—Valve in head. V. S.—Vanadium steel. W.—Worm. W. & G.—Worm and gear.

Maker	Maker of front axle	Shape and dimensions of front axle	Nature of material of front axle	Ground clearance, front axle	Maker of rear axle	Sectional shape and dimensions of rear axle	Nature of material of rear axle	Ground clearance rear axle (in.)	Normal road speed (m. p. h.)	Maximum road speed (m. p. h.)	Material and section of frame	Percentage wgt. of chassis on rear axle	Percentage wgt. of loaded truck on rear axle	Dimension (in.) of platform	Platform height, empty (in.)	Platform height, loaded (in.)	Percentage overload capacity
Alden Sampson Mfg. Co.		I		11		2x2		16	18		P. S.		66	108x60	44	41	
American Eagle M. C. Co.																	
Autocar Co.																	
Beck & Son.	n	Square	N. S.	9	Own	Square	N. S.	15	20	25	Ch. I.						
Blair Mfg. Co	n	Tube	S.	11	Own		C. N. S.	11			P. S.			Opt.			
Chase M. T. Co.	idon	1½x1½	S.	16	Sheldon	Square	S.	18	10	15	C. C. S.						
Decatur M. C. Co.																	
Garford Co.		Square	S.			Square	S.		10	15	R. W.						
Grabowsky P. W. Co.		1½x2½	N. S.	9		2x2	N. S.	12	¶15		C. P. S.	66	66	138x72	40	38	
Harwood Barley Mfg. Co.	n	I.	S.	11				10			C. P. S.						
Hewitt Motor Co.		I.	S.			I.	S.		15								
Ideal Auto Co.		I 1½x2½		13		2x2½		15½		15	C. S.	60		114x60	37		
◊Mack Bros. M. C. Co.																	
Mais M. T. Co.	eldon	2x2½	S.	16	Sheldon	2½x2½	S.	16	10	15	C. P. S.	40	60	120x60	37		None
W. H. McIntyre Co.	n	I 1½	N. S.	13	Own	2½x2½	N. S.	17	16	18	C. P. S.						50
Moreland M. T. Co.	n	Tube	N. S.		Own	Round	N. S.		15	15	C. N. S:			Opt.			
Nelson & LeMoon.	idon	1½x1½	S.		Own	1½x1½	S.		15	15	C. S.						
Oliver M. C. Co.	aken	I 2x2½		12½	Timken	1½x2½		6	15	20	C. S.		60				
Sandusky M. T. Co.	eldon	2x2½	N. S.	13	Sheldon	2½x2½	N. S.	15½	15	20	C. S.	55	45	110x48	35	33	33
Sternberg Mfg. Co.	mken	I.	S.	13	Own		S.	16	12	20	P. S.	50	85	132x60	46	42	33
Thomas Elevator Co.	n	1½x2½	N. S.	11	Own	1½x2½	N. S.	16	¶15	a17	C.C.N.S	25	60	114x52	46	43	25
U. S. Motor Truck Co.										15	P. S.		65				
Universal Mach. Co.	eldon	I.		14	Sheldon	1½x2½		16	15	22	Channel	40	70				50
Velie M. V. Co.	eldon			10	Own	Round	N. S.	16½	12	15	P. S.		60				
Walter M. T. Co.	n	1½x2	S.	12	Own	2x2½	S.	17	15	15	Channel	60	60	120x60	35	33	50
H. E. Wilcox M. C. Co.	aken		V. S.	11½	Own	4 tubing	S.	16	15	15	I.			144x66	34½		25
			S.	12			S.			18	C. S.						
	nken	I	S.	16	Timken	Round		15	15		C. S.	30	60	Opt.			

* Above motor † 60 rear

A.—Artillery
Exp.—Expanding.
wood. S.—Steel.
W. & N.—Worm

V.—Double irreversible worm. D. S. E.—Double semi-elliptic. D. S.—Differential screw. Double screw. E.—Elliptic.
kle. R. C. S.—Rolled channel steel. R. H.—Rear hubs. R. & P.—Rack and pinion. R. W.—Rear wheels. Reinforced
V. or Vert.—Vertical. V. in H.—Valve in head. V. S.—Vanadium steel. W.—Worm. W. & G.—Worm and gear.

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Maker	Normal load rating	Chassis list price		Maker of transmission	
Abrasch-Cramer A. T. Co.	4000	$3000			
American Locomotive Co.	4000	2950	D.	Own	S.
Atlas M. C. Co.	4000	2800		Own	S.
Atterbury M. C. Co.	4000			Own	S.
Avery Co.	4000	2500		Own	S.
Beck & Son	4000			Model	S.
B. F. Board M. T. Co.	4000	2775	D.	Cotta	Jaw
Brodesser M. T. Co.	4000	2650	D.	Cotta	S.
Buckeye Mfg. Co.	4000	1900		Lambert	
Byron Motor Co.	4000	2750		Own	S.
Chase M. T. Co.	4000	2200		Brown-Lipe	S.
L. H. Colvin	4000	2700			S.
Dayton A. T. Co.	4000	2500	D.	Brownell	S.
General M. T. Co.	4000	2750	D.	Own	S.
General Motors Co.	4000	2750		Own	S.
Grabowsky P. W. Co.	4000	3000			S.
Gramm M. T. Co.	4000	2600	D.	Own	S.
Hewitt Motor Co.	4000	2500			
Jarvis M. & S. Co.	4000	2650		Own	S.
Kelly Motor Truck Co.	4000	2800		Own	S.
Kissel M. C. Co.	4000	2750			S.
Knox Auto Co.	4000	3000	D.	Own	S.
Knox Auto Co.	4000	3200	D.	Own	S.
Knox Auto Co.	4000	3300	D.	Own	S.
Kopp M. T. Co.	4000		D.		S.
Lauth-Juergens M. C. Co.	4000	2700		Own	S.
Lewis M. T. Co.	4000	2800	D.	Cotta	S.
aMack Bros. M. C. Co.	4000	3000	D.	Own	Sch
W. H. McIntyre Co.	4000	2350	D.	Brown-Lipe	S.
Messinger Mfg. Co.	4000	2400		Own	S.
Modern M. T. Co.	4000	2600	D.	Warner	S.
Mogul M. T. Co.	4000	2700	D.	Driggs S.	S.
Morgan M. T. Co.	4000	3000	D.	Own	Mes
Motor Conveyance Co.	4000	2250	D.		S.
Packard M. C. Co.	4000	3000		Own	S.
Packers M. T. Co.	4000	2500	D.	Cotta	S.
Rowe Motor Co.	4000	3300			S.
Sayers & Scovill Co.	4000	2850		Cotta	S.
Stegeman M. C. Co.	4000	2950			S.
Sternberg Mfg. Co.	4000	2600			S.
Victor M. C. Co.	4000	2800			S.
Walter M. T. Co.	4000	3000		Own	S.

a International Motor Co., Distributors

A.—Artillery. A. I.—Angle iron. C. C. N...
Exp.—Expanding. F.—Float. J...kshaft. Jump spa...
wood. S.—Steel. S. B.—Solid... & G.—Splash a...
W. & N.—Worm and nut. W.

...Motor W...

Maker	Normal load rating	Chassis list price		Maker of transmission	Nature of ...
Abresch-Cramer A. T. Co.	6000	$3500			
Alden Sampson Mfg. Co.	6000	3400	D.		S. G.
Atterbury M. C. Co.	6000			Own	S. G.
Avery Co.	6000	3305		Own	S. G.
C. L. Barker	6000	3100	D.		
Beck & Son	6000			Model	S. G.
Blair Mfg. Co.	5000	3250			
B. F. Board M. T. Co.	6000	3375	D.	Cotta	Jaw
Brodesser M. T. Co.	6000	3200	D.	Cotta	Mesh
Buckeye Mfg. Co.	6000	2850		Lambert	F.
Byron Motor Co.	6000	3250		Own	S. G.
E. S. Clark	6000	3400			S. G.
Dayton A. T. Co.	6000	3500	D.	Brownell	S. G.
Garford Co.	6000			Own	S. G.
Grabowsky P. W. Co.	6000	3400			S. G.
Gramm M. T. Co.	6000	3500		Own	S. G.
Hewitt Motor Co.	5000	2750			
Jarvis M. & S. Co.	6000	3500	D.	Own	S. G.
Kelly Motor Truck Co.	6000	3300		Own	S. G.
A. R. King Mfg. Co.	6000				Mesh
Kissel M. C. Co.	6000	3350			S. G.
Knox Auto Co.	6000	3700		Own	S. G.
Kopp M. T. Co.	6000				S. G.
Lauth-Juergens M. C. Co.	6000	3200		Own	S. G.
Longest Bros. Co.	6000	3500		Own	S. G.
cMack Bros. M. C. Co.	6000	4000		Own	S. clut
W. H. McIntyre Co.	6000	2350		Brown Lipe	S. G.
Morgan M. T. Co.	6000	3500	D.	Own	Mesh
Moreland M. T. Co.	6000			Warner	S. G.
Motor Conveyance Co.	6000	3000	D.		
Mais M. T. Co.	5000	3000		Own	S. G.
New Haven T. & A. Works	6000		D.	Brownell	S. G.
Packard M. C. Co.	6000	3400		Own	S. G.
Peerless M. C. Co.	6000			Own	S. G.
Pope Mfg. Co.	6000	3250		Own	S. G.
Schacht M. C. Co.	6000	2900		Buda	S. G.
A. O. Smith Co.	6000	3500		Own	S. G.
Stegeman M. C. Co.	6000	3500			S. G.
Transit M. C. Co.	6000	3000	D.	Warner	S. G.
U. S. Motor Truck Co.	6000		D.	Cotta	S. clut
Universal Mach. Co.	6000			Own	S. G.
Universal M. T. Co.	6000	3200		Own	S. G.
Velie M. V. Co.	6000	3350		Brown Lipe	S. G.
Victor M. C. Co.	6000	3350	D.		S. G.
Walter M. T. Co.	6000	3400		Own	S. G.
H. E. Wilcox M. C. Co.	6000	3250		Own	S. G.

* Alongside driver. † Above Motor.

A.—Artillery. A. I.—...hannel iron. C. C. ...
Exp.—Expanding. F.—Flo... Jackshaft. Jump sp...
wood. S.—Steel. S. B.—... S. & G.—Splash ...
W. & N.—Worm and nut.

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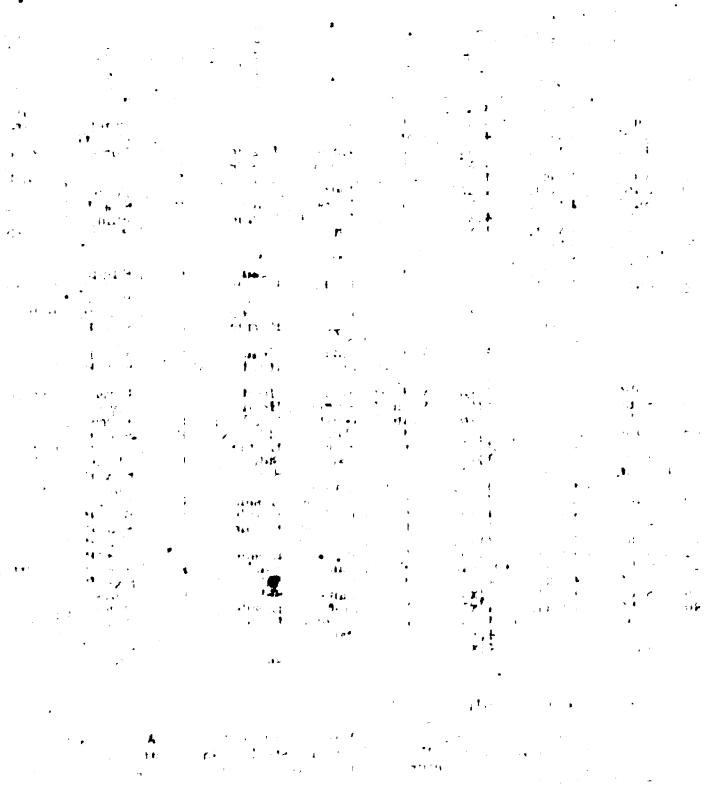

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...otor Wa...

Maker	Normal load rating	Chassis list price	Maker of transmission	Nature of transmission	Wheels rim detachable?
...merican Locomotive Co	7000	$3650	...wn	S. G.	C... es
...ir Mfg. Co	7000	3750	...	...	...
...S. Motors Co	7000		...	S. G.	S... o
...neral Motors T. Co	7000	3500		S. G.	J...
...neral Motors Co	7000	3500	...wn	S. G.	J...
...witt Motor Co	7000	3500	...wn	S. G.	3... o
...ckerbocker M. T. M. Co	7000	3500	...	...	...
...ex Auto Co	8000	4000	...wn	S. G.	C... es
...der Motor Co	8000		...wn	S. G.	J... es
...ack Bros. M. C. Co	8000	4250	...	...	...
...gal M. T. Co	8000	3600	...wn	S. clutch	C...
			D. Seabury	S. G.	J...
...ckers M. T. Co	7000	3400	...	...	...
...rians M. C. Co	8000		...otta	S. G.	J...
...odwell M. C. Co	8000	3400	...wn	S. G.	J... es
...gsman M. C. Co	8000	3950	...wn	S. G.	S... es
...rnberg Mfg. Co	8000	3750	...	S. G.	M...
...alter M. T. Co	7000	3500	...	S. G.	C...
			...wn	S. G.	J...

* 65 rear † 68½ rear ‡ with tires

A.—Artillery. A. I.—A...nnel iron. C. C. N. S.—...sed Exp.—Expanding. F.—Float...ckshaft. Jump spark. ...pet. wood. S.—Steel. S. B.—Sol... pet. W. & N.—Worm and nut. W... & G.—Splash and ...rd.

...otor Wa...

Maker	Normal load rating	Chassis list price	Maker of transmission	Nature of transmission	...
Alden Sampson Mfg. Co	10000	$4750	...	S. G.	...
American Locomotive Co	10000	4750	...	S. G.	...
C. L. Barber	10000	3600	...wn	S. G.	...
E. S. Clark	10000	4200	...	...	...
Dayton Auto T. Co	10000	4500	...	S. G.	...
Garford Co	10000		...rownell	S. G.	...
General Motors T. Co	10000	4400	...wn	S. G.	...
General Motors Co	10000	4400	...wn	S. G.	...
Grabowsky P. W. Co	10000	4500	...wn	S. G.	...
Gramm M. T. Co	10000	4500	...	S. G.	...
Hewitt Motor Co	9000	4000	...wn	S. G.	...
Jarvis M. & S. Co	10000	4250	...	...	...
Kissel M. C. Co	10000	4350	...wn	S. G.	...
Knickerbocker M. T. M. Co	10000	4500	...	S. G.	...
Knox Auto Co	10000	4500	...wn	Dogs	...
Kopp M. T. Co	10000		...wn	S. G.	...
Lorain M. T. Co	10000	4500	...	S. G.	...
Locomobile Co	10000	4500	...otta	Dogs	...
Logan Bros. Co	10000	3500	...wn	S. G.	...
Mack Bros. M. C. Co	10000	4800	...wn	S. G.	...
Morgan M. T. Co	10000	4750	...wn	S. clutch	...
Moreland M. T. Co	10000		...wn	Mesh.	...
New Haven T. & A. Works	10000	4500	...	Warner	S. G.
Parisian M. C. Co	10000		...	Brownell	S. G.
Pierce-Arrow M. C. Co	10000	4500	...wn	S. G.	...
Reliance Motor Co	9000	5000	...wn	S. G.	...
W. H. Stearns Co	10000		...wn	S. G.	...
F. B. Stearns Co	10000	3800	...	S. G.	...
Stoddard M. C. & T. Co	10000	3000	...wn	S. G.	...
Thorn M. C. Co	10000	4300	...overt	S. G.	...
Velie M. T. Co	10000	4200	...	S. G.	...
			...wn	S. G.	...

* International Motor Co., distributor

A.—Artillery. A. I.—An...nnel iron. C. C. N. S.—... Exp.—Expanding. F.—Float...ckshaft. Jump spark. ... wood. S.—Steel. S. B.—Soli... & G.—Splash and ... W. & N.—Worm and nut. W...

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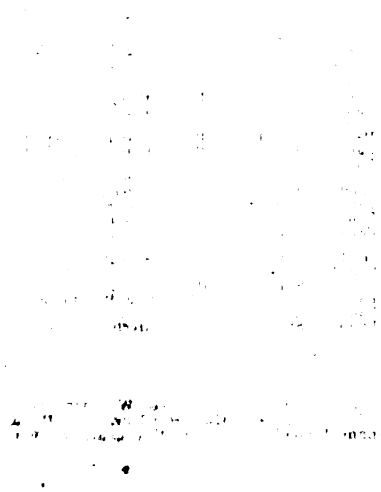

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Maker	Normal load rating	Chassis list price	Maker of transmission	Nature of transmission	Position of transmission
I. Jaccard & Co. (Aries)	14000	$6000			
Hewitt Motor Co.	11000	4500			
Hewitt Motor Co.	14000	5000			
Hewitt Motor Co.	20000	5500			
Knox Auto Co.	12000	5000		S. G.	Center
Mack Bros. M. C. Co.	14000	5300		S. G.	J. S.
Mogul M. T. Co.	12000	4400		S. clutch	Center
Motor Conveyance Co.	12000	6000	eabury	S. G.	J. S.
Saurer Motor Co.	13500	6000		S. G.	Center
Speedwell M. C. Co.	12000	4350		S. G.	Center
Stegeman M. C. Co.	12000	4750		S. G.	Subf.
Sternberg Mfg. Co.	12000	4500		S. G.	Motor
Victor M. C. Co.	14000	5200		S. G.	Center
Victor M. C. Co.	20000	5800		S. G.	
				S. G.	

*International Motor Co., Distributors.

A.—Artillery. A. I.—
Exp.—Expanding. F.—Flexel iron. C. C. N. S.—Ch
wood. S.—Steel. S. B.—shaft. Jump spark. L.
W. & N.—Worm and nut. & G.—Splash and gravi

Maker	Passenger capacity	Maker of transmission	Nature of transmission	Position of transmission
Beck & Son	18			
Bessemer M. T. Co.	10	el	P.	B. engine
Bessemer M. T. Co.	8			
Bessemer M. T. Co.	6			
Buckeye Mfg. Co.	5			
Buckeye Mfg. Co.	4	bert	F.	
Buckeye Mfg. Co.	2	bert	F.	
Buckeye Mfg. Co.	4	bert	F.	
Chicago P. T. Co.	5	bert	F.	
Day Auto Co.	9	bert	F.	
H. H. Franklin M. Co.	5		P.	J. S.
General Motors T. Co.	12	n-Lipe	S. G.	Motor
General Motors T. Co.	15		S. G.	Center
Knox Auto Co.	24		S. G.	J. S.
Knox Auto Co.	16		S. G.	J. S.
Knox Auto Co.	22		S. G.	Motor
Knox Auto Co.	26		S. G.	J. S.
Knox Auto Co.	35		S. G.	J. S.
Lippard-Stewart M. C. Co.	10		S. G.	J. S.
Oliver M. C. Co.	12		S. G.	Center
Packard M. C. Co.	32		P.	Motor
Packard M. C. Co.	37		S. G.	J. S.
Pratt, Carter, Sigsbee	8		S. G.	J. S.
Rowe Motor Co.	20		F.	U. S.
Schacht M. C. Co.	20		S. G.	Center
Shelby M. C. & T. Co.	22		S G.	Center
Victor M. T. Co.	15	rt	S. G.	J. S.
Victor M. T. Co.	20		S. G.	
Victor M. T. Co.	24		S. G.	
Victor M. T. Co.	30		S. G.	
Victor M. T. Co.	*I .S .S		S. G.	

* Inclosed sight seer † With Th

A. C. S.—Alloy channe
side. R. F. & R. R.—Right

I.—Inclosed. J. S.—J
U. S.—Under seat.

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reduction	Chains open or inclosed	Standard wheel base	Track or gauge	Maker of steering gear	Steering control right, left or central	Wheel or lever steer	Frame material and section	Nature of bumper, if any	Type of front wheels	Type of rear wheels	Wheel rim detachable?	Wheel and hub detachable?	Dimensions of platform loading area	Platform height truck empty	Platform height, truck loaded
to 1	O.	80	56	Gemmer	L.	W.	C. S.	Opt.	A.	A.	No	.....	Opt.	33	31½
to 1	.....	86	54	Ross	L.	W.	R. S.	.....	A.	A.	Opt.	Yes	90x42	33½	31
to 1	.....	80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
to 1	.....	85	56½	.....	L.	W.	S. S. C.	.....	A.	A.	.....	.....	66x42	35	34
to 1	.....	90	56½	.....	L.	W.	S. S. C.	.....	A.	A.	.....	.....	72x42	35	34
.....	O.	74	52	.....	.....	W.	.....	.....	A.	A.	.....	.....	.....	33	30½
.....	O.	81½	55	.....	.....	W.	.....	.....	A.	A.	.....	.....	.....	36½	33½
.....	O.	70	56	.....	L.	Lever	S. angle	.....	Sarven	Sarven	No	No	.....	.....	.....
.....	O.	82	56	.....	L.	Lever	S. angle	.....	A.	A.	No	No	.....	.....	.....
.....	Opt.	86	56	.....	L.	W.	Trussed	.....	Wood	Wood	No	No	75x42	34	32
to 1	O.	88	56	M. W.	L.	W.	C. P. S.	.....	.....	.....	No	Yes	80x44	36	34½
to 1	.....	80	56	Warner	L.	W.	C. P. S.	.....	A.	A.	Yes	.....	74x32	.....	.....
.....	.....	Opt.	56	Own	L.	W.	L. S.	.....	Disk	Disk	Opt.	Yes	Opt.	37	36
.....	.....	.....	50	.....	L.	L.	.....	.....	A.	A.	.....	.....	68x40	.....	.....
.....	.....	.....	54	.....	L.	L.	.....	.....	A.	A.	.....	.....	72x46	.....	.....
.....	.....	86	54	.....	L.	W.	.....	.....	.....	.....	.....	.....	63x36	.....	.....
.....	I.	87	54	.....	L.	W.	R. W.	.....	A.	A.	.....	.....	48x36	31	26
to 1	O.	84	58	Gemmer	L.	W.	C. S.	Opt.	A.	A.	No	.....	Opt.	33	31½
to 1	.....	96	54	Ross	L.	W.	R. S.	.....	A.	A.	Opt.	Yes	100x42	33½	31
to 1	O.	85	56	Special	L.	W.	C. P. S.	.....	A.	A.	Yes	Yes	80x40	34	32
.....	.....	.....	56	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
to 1	.....	100	56½	.....	L.	W.	S. S. C.	.....	A.	A.	.....	.....	102x50	35	34
.....	O.	102	60	.....	.....	W.	.....	.....	A.	A.	.....	.....	.....	39	36
.....	O.	88	56	Ross	L.	W.	C. S.	.....	A.	A.	No	No	.....	.....	.....
to 1	O.	100	56	M. W.	L.	W.	C. P. S.	.....	.....	.....	No	Yes	96x46	36	34½
.....	.....	Opt.	56	Own	L.	W.	L. S.	.....	Disk	Disk	Opt.	Yes	Opt.	39	37
.....	.....	.....	57½	.....	L.	L.	.....	.....	A.	A.	.....	.....	100x50	.....	.....
.....	.....	90	56	.....	L.	W.	.....	.....	.....	.....	.....	.....	84x40	.....	.....
.....	O.	97½	60	Own	L.	W.	R. W.	.....	A.	A.	.....	.....	84x40	38	35
.....	O.	97½	60	Own	L.	W.	R. W.	.....	A.	A.	.....	.....	100x40	38	35
o 1	O.	96	62	Gemmer	L.	W.	C. S.	Opt.	A.	A.	No	.....	Opt.	34	32½
o 1	O.	95	56	Special	L.	W.	C. P. S.	.....	A.	A.	Yes	Yes	100x40	35	33
to 1	.....	116	66	.....	L.	W.	S. S. C.	.....	A.	A.	.....	.....	132x50	35	34
.....	O.	111½	61	.....	.....	W.	.....	.....	A.	A.	.....	.....	.....	44½	41½
to 1	.....	112	.....	M. W.	L.	W.	C. P. S.	.....	.....	.....	No	Yes	120x54	37	35
.....	.....	Opt.	56	Own	L.	W.	L. S.	.....	Disk	Disk	Opt.	Yes	Opt	42	40
.....	.....	.....	64	.....	L.	W.	.....	.....	A.	A.	.....	.....	108x58	.....	.....
.....	.....	.....	64	.....	L.	W.	.....	.....	A.	A.	.....	.....	120x58	.....	.....
.....	.....	93	58	.....	L.	W.	.....	.....	.....	.....	.....	.....	96x44	.....	.....
.....	.....	112	64	.....	L.	W.	.....	.....	.....	.....	.....	.....	108x44	.....	.....
...	O.	118	60	Own	L.	W.	C. S.	.....	A.	A.	.....	.....	120x54	38	35
to 1	O.	120	64	Special	L.	W.	C. P. S.	.....	A.	A.	Yes	Yes	150x48	39	37
to 1	.....	115	66	.....	L.	W.	S. S. C.	.....	A.	A.	.....	.....	156x58	35	34
to 1	.....	132	66	.....	L.	W.	S. S. C.	.....	A.	A.	.....	.....	192x68	35	34
to 1	.....	96	66	Own	R.	W.	C. S.	.....	Couple G'r	Couple G'r	Yes	Yes	168x60	46	44
to 1	.....	96	72	Own	R.	W.	C. S.	.....	Couple G'r	Couple G'r	Yes	Yes	168x72	46	44
.....	O.	126	65	.....	.....	W.	.....	.....	A.	A.	.....	.....	.....	46	42½
.....	O.	139	69	.....	.....	W.	.....	.....	A.	A.	.....	.....	.....	.....	.....
to 1	.....	124	.....	M. W.	L.	W.	C. P. S.	.....	.....	.....	No	Yes	140x58	38	36
o 1	.....	136	.....	M. W.	L.	W.	C. P. S.	.....	.....	.....	No	Yes	150x62	40	38
	.....	Opt.	56	Own	L.	W.	C. S.	S.	Disk	Disk	Opt.	Yes	Opt.	44	42
	.....	Opt.	56	Own	L.	W.	C. S.	S.	Disk	Disk	Opt.	Yes	Opt.	45	43
.....	.....	.....	64	.....	L.	W.	.....	.....	A.	A.	.....	.....	132x58	.....	.....
.....	O.	120	73	Own	L.	W.	C. S.	.....	A.	A.	.....	.....	144x60	44	41
.....	O.	140	73	Own	L.	W.	C. S.	.....	A.	A.	.....	.....	168x72	45	42

-Inclosed. J. S. Jacksha mi-elliptic. S. S. C.—Structural steel channel. S. S.—Structural steel.

road wheels	Gear reduction	Chains open or inclosed	Steering control right, left or central	Wheel or lever steer	Frame material and section	Nature of bumper, if any	Type of front wheels	Type of rear wheels	Wheel rim detachable?	Wheel and hub detachable?	Location of entrances	Location of exits a..
ain	11.5 to1	O.	L.	W.	C. S.	Tube	A.	A.	No	.....	Rear	Rear
& G.	9½ to 1	.....	L.	W.	S. S. C.	.....	A.	A.	.....	.....	Rear	Rear
G.	11½ to 1	.....	L.	W.	S. S. C.	.....	A.	A.	.....	.....	Rear	Rear
ain	8 to 1	.....	L.	W.	C. P. S.	.....	.....	.....	Yes	Yes	Rear	Rear
ain	.....	.....	L.	W.	.....	.....	.....	.....	.....	.....	.....	.....
ain	.....	.....	L.	W.	.....	.....	.....	.....	.....	.....	.....	.....
ain	.....	.....	L.	W.	.....	.....	.....	.....	.....	.....	.....	.....
ain	.....	.....	L.	W.	.....	.....	.....	.....	.....	.....	.....	.....

D.—Drum. E.—Elliptic. ry gear. P. S.—Pressed steel. R. A.—Real axle. R. H.—Rear
ic. S. P.—Steering post. steel. W.—Wheel. West.—Westinghouse.

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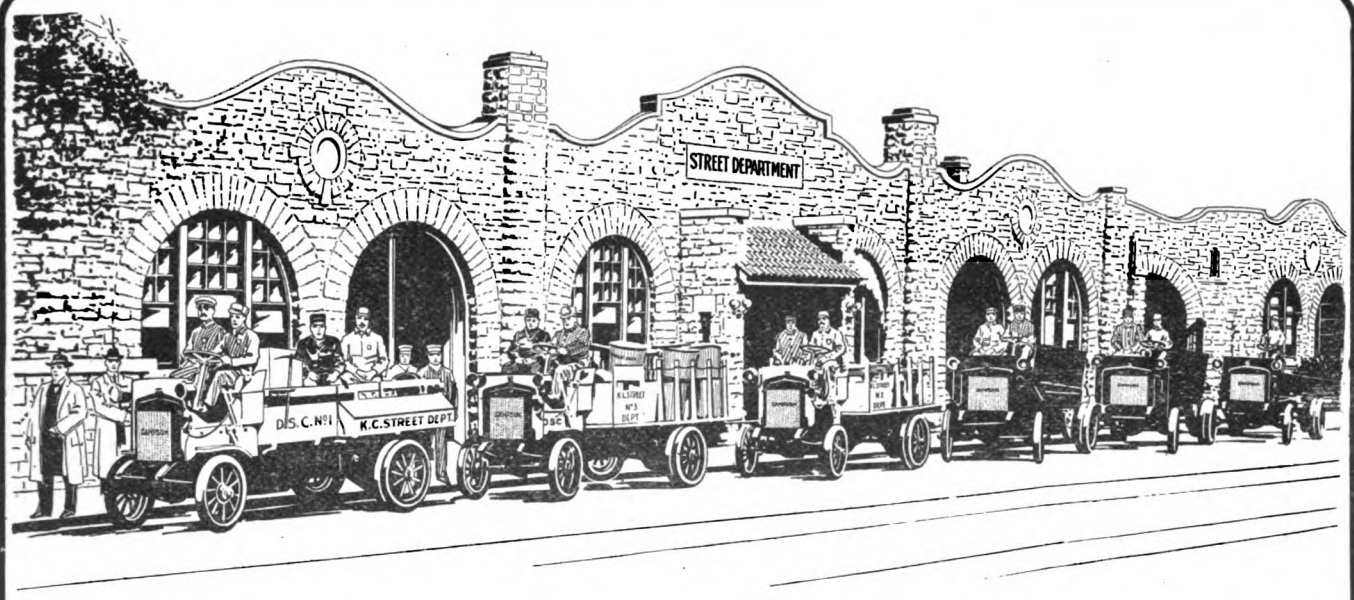

6 Sampson Trucks that save $5010 a month

THEY are in the service of the Kansas City Street Department. Each one does the work formerly done by from seven to nine horse drawn wagons.

When the wagons were used they cost $960 a month to maintain and operate. To do the same work the Sampson costs $125 a month —a saving of $835 on each one, or $5010 each month for six Sampsons.

Thus the trucks pay for themselves in six months' time. These figures are official.

Kansas City bought its trucks judiciously—they bought Sampsons in preference to seventeen other makes. The city officials are satisfied.

Hundreds of other Sampson users are thoroughly pleased with the work of their trucks. Right in Detroit where Sampsons are built they are held in highest esteem. The Detroit Fire Department, the Water Department, the Health Department, all selected Sampsons because they are built right and are always reliable.

Many big corporations have bought Sampsons and are daily adding more to their equipment.

Edgar's Sugar House in Detroit, had the best opportunity to judge motor trucks. From eighteen different trucks built in their own city, they selected the Sampson. Four Sampsons have been purchased by them in eighteen months.

The New England Telephone and Telegraph Company owns 20 Sampsons and more are being built for them.

In a hundred lines Sampson Trucks are saving money and increasing business for their owners.

What about ***your*** business?

Is there a proportionate saving to be made in ***your*** delivery systems? Have you ever figured what Motor Truck Delivery might do for you in comparison with horse-drawn delivery?

Let us figure it out with you—there is a Sampson Truck for the specific needs of your business.

In buying a Sampson you run no risk. Personal service goes with each truck sold—a service that sees that your truck keeps running and does what it is intended to do.

UNITED STATES MOTOR COMPANY

(SAMPSON DIVISION) **47 West 61st St., at Broadway, New York City**

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The Durable Dayton

Now offered to the Buyer and Dealer in a complete selling line —a model for every service required in motor transportation.

Model H—Capacity 1½ Ton
Model K—Capacity 3 Ton
Model M—Capacity 5 Ton

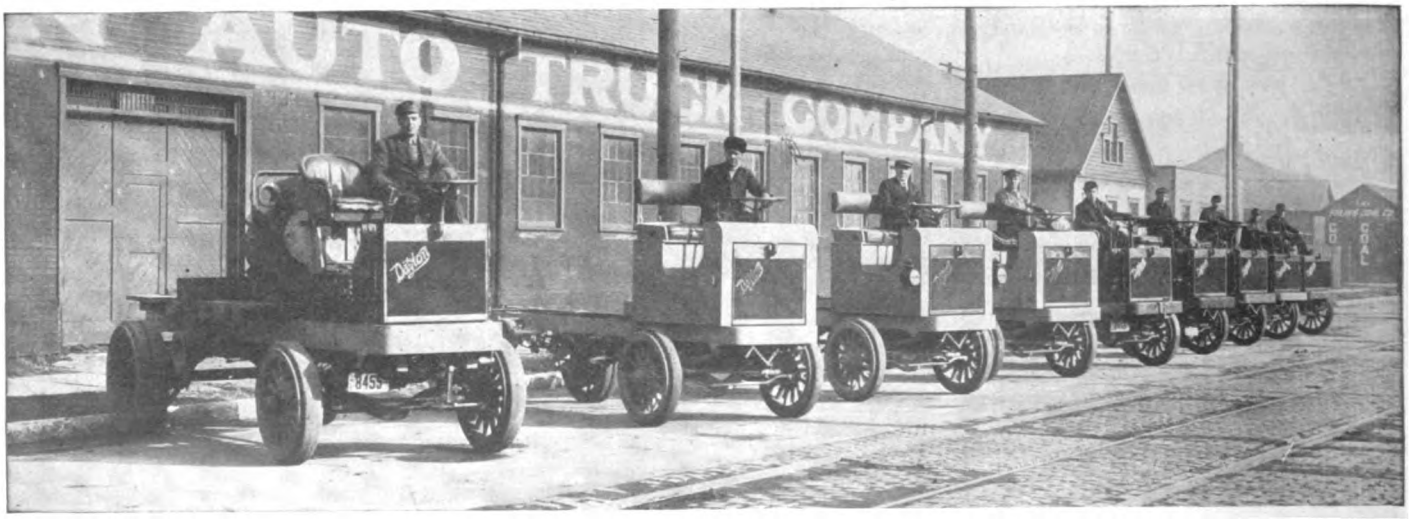
The most dependable line of *Specially Designed* Motor Trucks produced by any one concern in the industry.

Dealers will readily appreciate the excellent opportunities in handling a dependable model to fit every business condition.

Judging from the reputable dealers who have already concluded business connections with us, it is evident that our selling policy is recognized as the same high character which dominates the entire Durable Dayton factory and organization.

There are are several good makes of motor trucks on the market. The Durable Dayton is one of them. No buyer or dealer should contract for motor wagons until he has at least given us the opportunity to demonstrate the merit of our models.

Send for our List of Dealers and Highly Satisfied Users.



DURABLE DAYTON MODELS H, K AND M—READY FOR ROAD TEST

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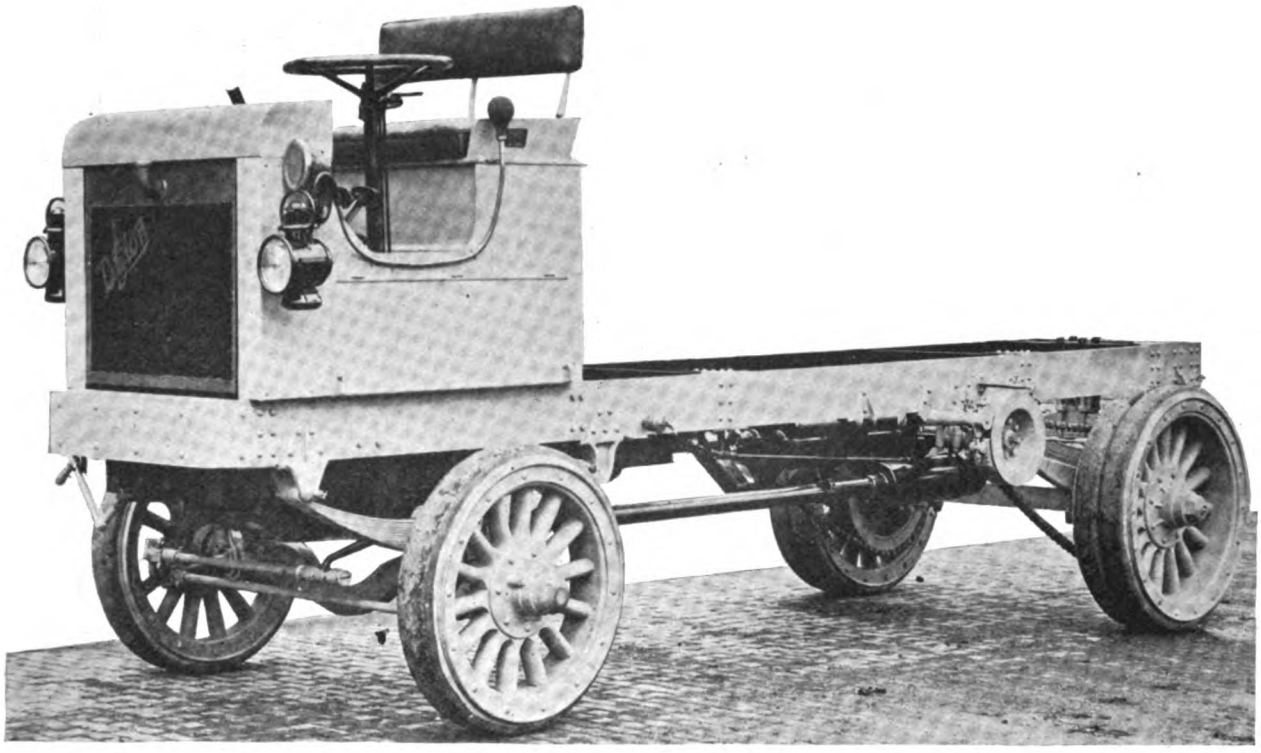
New Model M—Capacity 5 Ton



See our complete line at the National Show.
Chicago—February 3-10, 1912.

Choice Territory open to discriminating dealers. Investigate THE DURABLE DAYTON before closing for 1912.

Complete Illustrated Catalog mailed upon receipt of inquiry—Send for a Copy TODAY.

The Dayton Auto Truck Company

DAYTON, OHIO, U. S. A.

Factory Branches, Chicago-New York

Master Builders of Dependable Motor Trucks and Power Wagons

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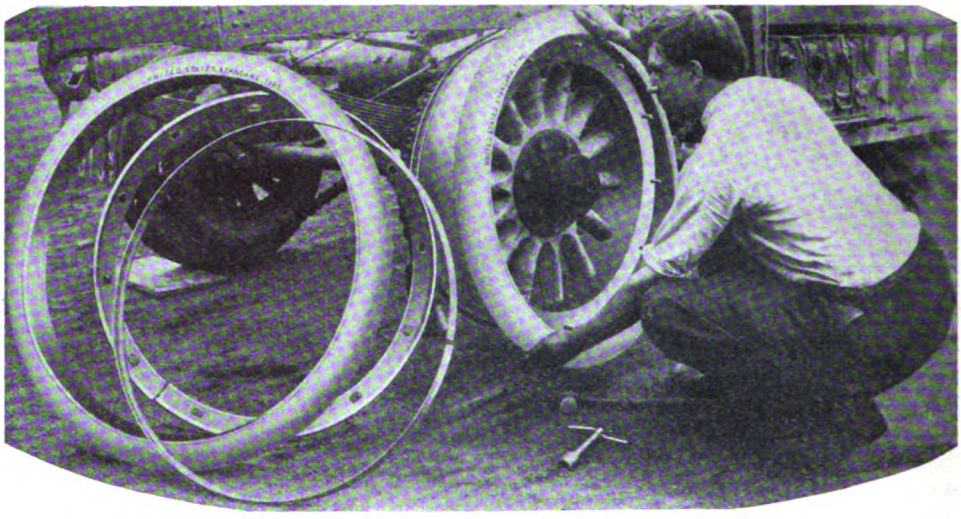
The stopping of a $25 a day loss



A COMPLETE TIRE CHANGE WITHOUT REMOVING THE WHEEL

At the lowest possible estimate, the service performed by each truck you own is worth from $15 to $25 a day to you.

Yet you have been compelled to endure this loss — tie-up your whole delivery system — disarrange your entire business sometimes for days at a stretch, every time it became necessary to send a wheel away to some service station for a tire replacement.

Fortunately for you truck owners that sort of waste and inconvenience has been done away with—

The New NEW UNITED STATES STANDARD MOTOR TRUCK TIRE (Demountable) has Accomplished it.

This demountable tire can actually be changed **anywhere**—at the roadside, in the garage after working hours by the driver himself—in **15 minutes' time.**

As if this was not enough improvement to make in one tire, we have gone further—we have put a rubber compound into these tires which for wearing quality has never before been approached by any tire made in America.

(Continued.)

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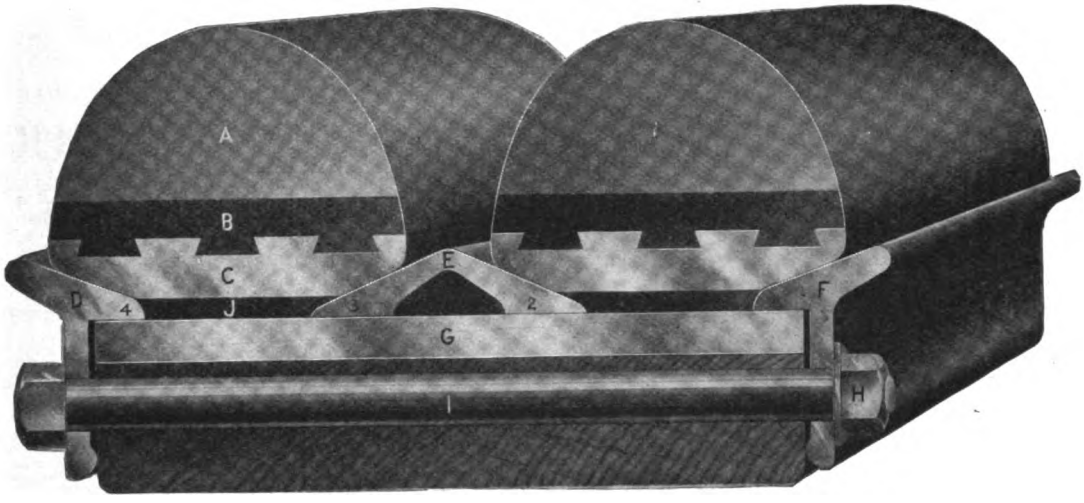
—and the tire that did it!



CROSS SECTION VIEW OF UNITED STATES STANDARD TWIN TIRE AND DEMOUNTABLE RIM

A—Tough Rubber Tread
B—Hard Rubber Base
C—Metal Base
D—Inside Flange Wedge Ring
E—Center Wedge Ring
F—Outside Flange Wedge Ring

THE NEW UNITED STATES STANDARD MOTOR TRUCK TIRE (Demountable)

The rubber stock and metal base construction used in this United States Standard Tire are exact duplicates of the famous "Continental" Tire made in Hanover, Germany, acknowledged by manufacturers and engineers the world over to be the longest wearing tire ever produced.

And we back up our faith in our Standard Tire by placing on it a higher guaranteed mileage than any American maker has ever dared to do before.

We absolutely guarantee the UNITED STATES STANDARD TIRE for 10,000 miles of service, conditional upon its being used within one year.

No one who is figuring on buying a new truck or refitting an old one, should think of going ahead without investigating this remarkable tire.

An elaborate book entitled *"A Revolution in Tires for American Motor Trucks"* explains every feature. If you have not already seen it by all means send for a copy today.

United States Tire Company

BROADWAY AND 58th STREET, NEW YORK

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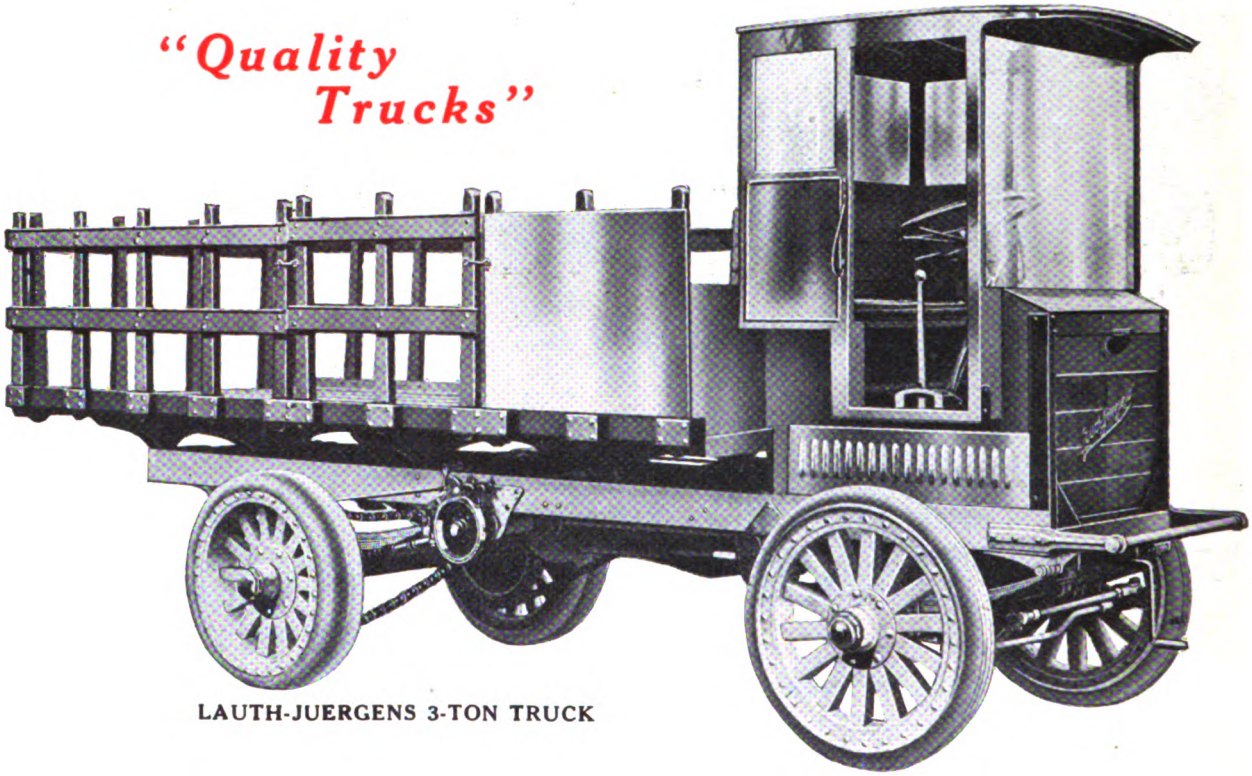
Lauth-Juergens

ONE, TWO AND THREE-TON TRUCKS

"Quality Trucks"



LAUTH-JUERGENS 3-TON TRUCK

One essential requirement of a truck, to give the purchaser the highest efficiency, is the "QUALITY" of material and workmanship, the sound engineering construction, which permits of long life without costly repairs, and a maker of ample responsibility, who is able to stand back of a guarantee in the fullest sense of the word.

The other essential requirement is the never ending "SERVICE" which we give you thru the proper channels. The organization we have in connection with our factory will permit you to get SERVICE under all conditions —that service which keeps your truck running daily no matter what happens. We are prepared to afford you this distinct service and no other manufacturer of Motor Trucks, large or small, gives you service equal to that which we give.

With a guarantee of QUALITY and SERVICE your investment in a Lauth-Juergens Truck is secure and a paying one.

Lauth-Juergens trucks represent the highest type of construction in Motor Truck building. The motors are guaranteed for the life of the truck, the truck is guaranteed against imperfect workmanship and material—every part of it—and we are financially able to stand back of any proposition or guarantee we make to any purchaser of Lauth-Juergens trucks. They are in a class by themselves and the QUALITY we give you gives you delivery insurance.

Reliable parties who are seeking an opportunity to handle a high-grade truck should communicate with us at once regarding 1912 territory.

Watch for us at the show in Armory in Chicago.

Address

THE LAUTH-JUERGENS MOTOR CAR CO.

FREMONT, OHIO

CHICAGO, ILL.
THE LAUTH-JUERGENS MOTOR CAR CO.
2630-32 Wabash Ave.

NEW YORK
WEST SIDE GARAGE AND MOTOR CO.
160-162 West 101st Street

BOSTON, MASS.
LAUTH-JUERGENS MOTOR CO. OF NEW ENGLAND
11 Harcourt St.

NEWARK, N. J.
MERCHANT'S MOTOR CAR COMPANY
Essex Building

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Lauth-Juergens Features Four Speed Trasmission

The four speed transmission used in our one, two and three ton Models has a three point suspension and is housed as a unit with the Differential and Jackshaft. It has a reverse gear which drops into mesh and is never in motion except when in use. The entire transmission and jackshaft is fitted with Hess-Bright ball bearings, including the end thrust ball bearing on either end of the shaft of the transmission not engaged. The large case is made of aluminum alloy, making it both light and strong. The gears are cut from solidcy cloid steel, tempered and hardend to a degree which will give it the most efficiency. This transmission is made entirely in our own factory by experts of long training who enable us to offer you the latest to be had in transmissions.

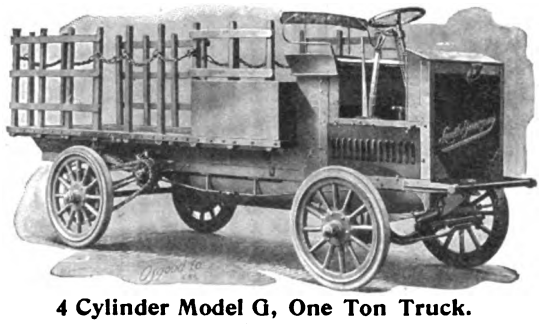
3 Piece Dry DISC CLUTCH

A modern invention perfected to such a degree that it will wear indefinitely and can not get out of order, is positive in operation and the simplest clutch made. It consists of 3 pieces, two steel discs between which is a wood fibre disc attached to the flywheel, and when in operation the two steel discs clamp evenly and tight to the wood fibre, making a positive engagement. It is operated off the flywheel by roller bearing and has a ball bearing foot thrust.

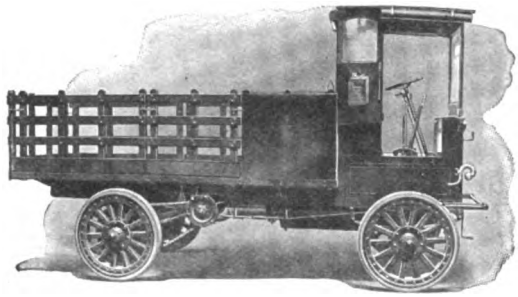
OTHER FEATURES

The other features are the Mea Magneto which is optional equipment for the three ton trucks, the double Ignition System, and the complete upholstered cab which is furnished as a part of the chassis.

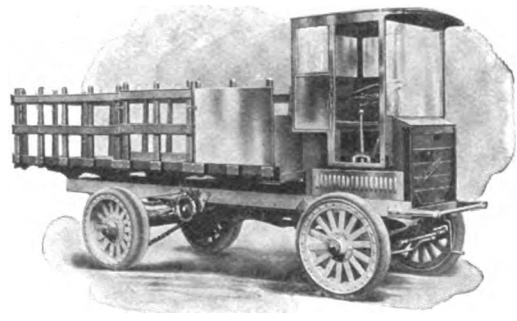
2 Cylinder, Model F, One Ton Truck.
Price $1750.00 Complete with Body and Painted and Lettered.



4 Cylinder Model G, One Ton Truck.
Price $2100.00 Complete with Body and Painted and Lettered.



4 Cylinder Model H, Two Ton Truck.
Price $2850.00 Complete with Stake Body, and Paint and Lettering.



4 Cylinder Model I, Three Ton.
Price $3400.00, Complete With Stake Body, Painted and Lettered.

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BUILT ON STEEL

GOOD

WIRE

TIR

THE B.F. GOOD

AKRON,

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WEAR LIKE STEEL

RICH

LESS

ES

RICH CO.
OHIO.

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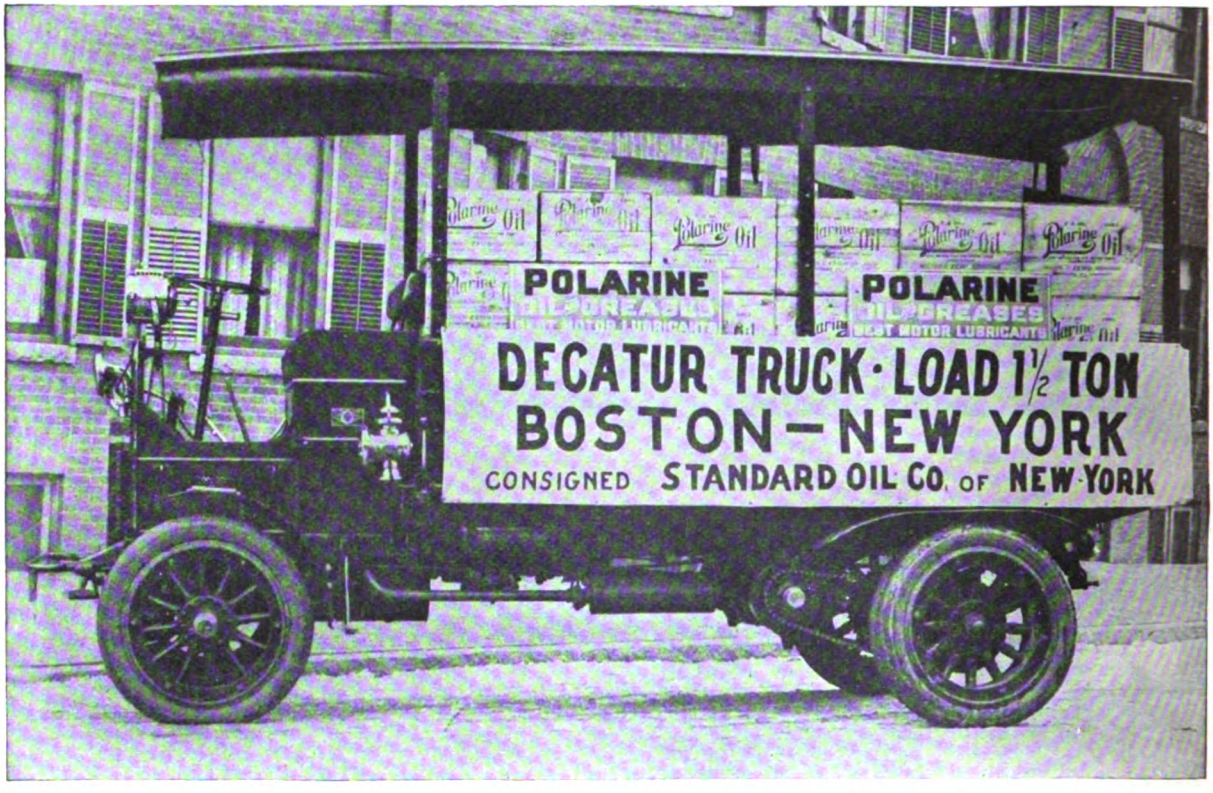
WORLD'S NON-STOP

DECATUR HOOSIER LIMITED ESTABLISHES WORLD'S NON-STOP RECORD FOR 1½ TON MOTOR TRUCKS



DECATUR TRUCK WHICH ESTABLIHSED WORLD'S NON-STOP RECORD—JAN. 10-17—FOR 1½-TON MACHINES. LOAD, 3500 POUNDS.

DECATUR MOTOR

DECATUR, INDIANA

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RECORD BROKEN

The history of long distance, non-stop, motor road trucking for 1 1-2 ton machines, contains no record of achievement more noteworthy than the recent performance of a DECATUR truck of 3000 lbs. load rating, which, with full load, journeyed from BOSTON to NEW YORK and about the latter city's streets for

SEVEN CONTINUOUS DAYS!

COVERING A DISTANCE OF

1063 MILES IN 168 HOURS

MOTOR WAS NOT STOPPED ONCE!

OFFICIALLY SANCTIONED BY A. A. A.

Continuity of service is a vital factor in the cost accounting of motor truck transportation. No merchant wishes to speculate upon interruption to service. The simple fact that the DECATUR HOOSIER LIMITED accomplished a long distance journey under adverse weather and road conditions, is ample proof that its builders are sure of its staying qualities and every feature of its design.

WE WILL EXHIBIT AT BOSTON SHOW

We have some open territory for live agents who are responsible, financially and otherwise, to handle a truck agency on a proper basis. Write for catalog and proposition.

CAR COMPANY

DECATUR, INDIANA

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GAYLOR-ATLAS

Quick Attachable Grips for Solid Tires offer the first real solution to the traction question for solid tired vehicles. Efficient—harmless to tires—self-adjusting and easy to attach.

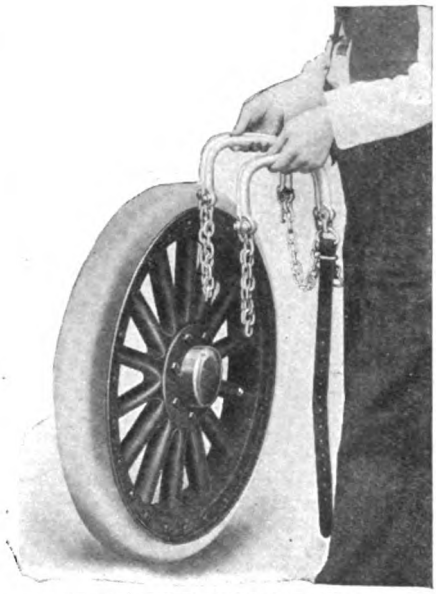

Fig. 1. Holding Grips Correctly—Ready to Attach

TIRE GRIPS to be of real help should be so compact in form that they can be carried at all times in the tool box of the car, ready for attachment at a moment's notice, when occasion requires. Conditions requiring grips are often encountered unexpectedly, and the driver of a car who is unprepared will often be put to much inconvenience, if not actual loss.

The Gaylor-Atlas Quick Attachable Grips have been designed to meet just such requirements. They are made in the simplest possible form, and with only as many gripping shoes as have been found necessary to do the work, thus making them comparatively light in weight and so compact in form that they may be carried in an ordinary tool box.

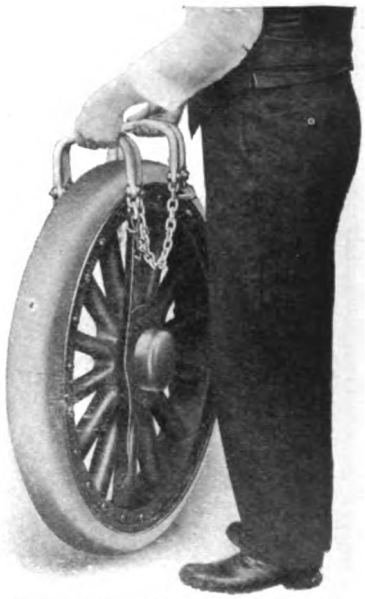

Fig 2. Laying Grips on Tire—Note Position of Strap in Left Hand

One of the chief difficulties experienced heretofore with all solid steel grips intended for use with solid tires, has been the necessity of making the shoes or cross members an exact fit to each different width of tire and rim, or, in fact, to every different make of tire and rim as well. This meant that each grip could be used only on the make of tire and rim for which the grip was specially built. To the owner who operated several cars, equipped with tires of the same size but of different makes, this non-adjustable feature of the grips entailed both annoyance and expense.

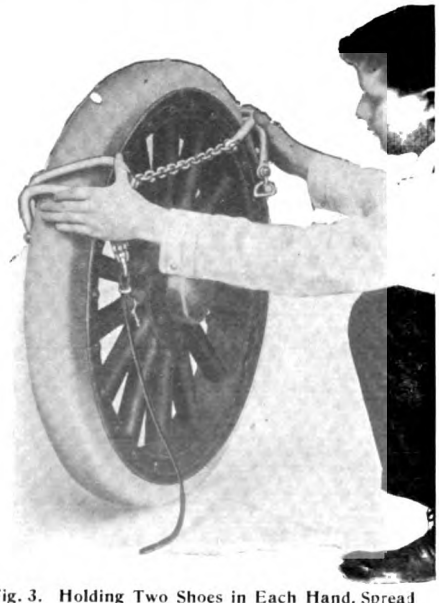

Fig. 3. Holding Two Shoes in Each Hand, Spread Apart on Tire Until Connecting Chain is Tight

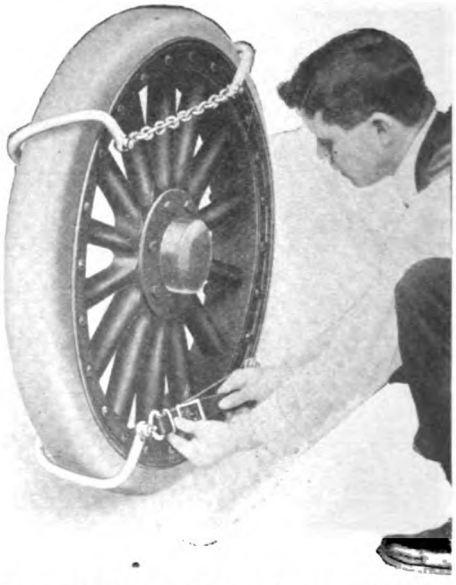

Fig. 4. Then Slide Remaining Two Shoes Toward Bottom of Wheel as far as they will go, and Engage Strap in Buckle

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GAYLOR-ATLAS

Grips are made from Chrome Vanadium Steel—heat treated —which provides durability and anti-fatigue properties. They are made for both single and dual type tires.

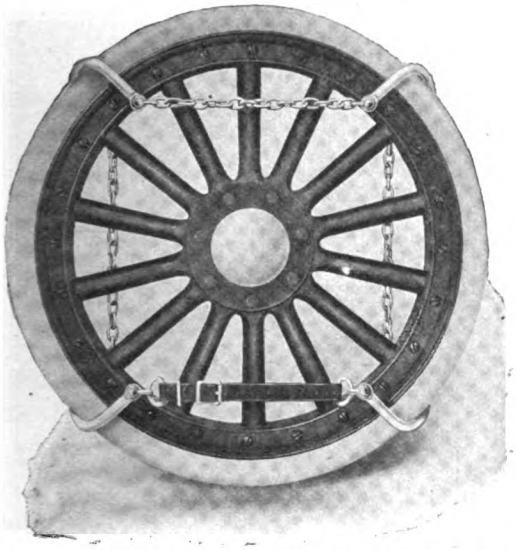

Fig. 5. See that Chains and Connections are not Twisted or Kinked—Move Each Shoe a Little to see that it is free; then Draw up Strap Snugly—and Go. Time of Application, Two Minutes.

Certainly if the cars were to be ready for immediate service, at all times, each car required its own individual grips built especially for it.

With the Gaylor-Atlas grips all this is obviated, the construction being such that a moderate variation in either tire or rim width makes absolutely no difference to the satisfactory working of the grips.

By referring to the various illustrations it will be seen that the shoes or cross members of the Gaylor-Atlas grips are made considerably wider than is necessary to directly span the tire and rim, so that when the chains are drawn tight the shoes lie diagonally across the face of the tire, and are caused to hug the rim on both sides of the wheel.

The Gaylor-Atlas grips are made with four gripping shoes only, for the reason that as the shoes lie diagonally across the face of the tire they give a driving efficiency equal to six or more shoes which lie straight across.

Owing to the fact that on Commercial Cars the clearance between the rim of wheel and drive chain is usually very small, it is positively dangerous to use chains or grips of any type having a double side chain with a fastening means on the inside or drive chain side of wheel.

Gaylor-Atlas grips as constructed do not have continuous side chains on either side of wheel and the only fastening means is on the outside; therefore, there are no loose parts on the inside of wheel to interfere or catch in the driving chain.

Another great advantage of Gaylor-Atlas grips is the quickness with which they can be attached and detached. No tools are required but the hands, and not more than two minutes is necessary to secure the grips to a wheel, and they may be detached in less time. This enables the operator to run his car with grips only when necessary, and thus save all needless wear, besides the advantage of always having them with him ready for use, should they be required.

Gaylor-Atlas Quick Attachable Grips are not intended for winter use alone, they are needed at all times of the year. Even under ordinary conditions when no grips are required for running on hard roads, a driver may be required to run his car in places where he may encounter soft dirt, sand, mud, oil or wet clay and the worth of a set of grips at such times will be many times their cost. We therefore recommend our grips for use all the year round, when conditions require, and no driver should be without a set in his car either in winter or summer, if the delivery record is to show high efficiency.

Material entering into the construction of Gaylor-Atlas Grips is of the very highest quality obtainable and selected with a proper understanding of the conditions under which the grips will operate.

All the shoes or cross members are made from Chrome Vanadium steel, heat treated in the most approved manner in our own factory and capable of withstanding more than the ordinary amount of accidental or customary hard usage.

Shoe connecting chains are made from Norway Iron, selected for its reliability and great strength.

All parts are carefully inspected and tested before shipment. Breakage of any part through defective material will be replaced free of charge.

Exhibiting at Chicago and Boston Auto Shows. Catalogue on request.

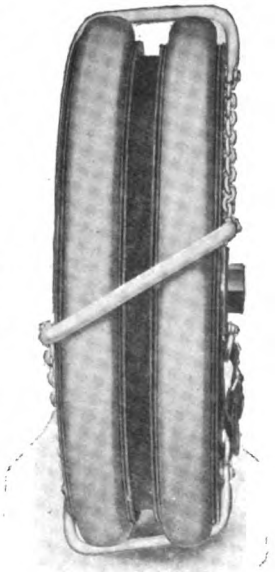

Fig. 6. Showing Application to Dual Tires. Method of Attachment is same as with Single Tires

ATLAS CHAIN COMPANY

Bush Terminal No. 4 **BROOKLYN, N. Y.**

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COMPLETE INSTALLATIONS GASOLINE GMC GENERAL MOTORS COMPANY TRUCKS ELECTRIC COMPLETE SERVICE

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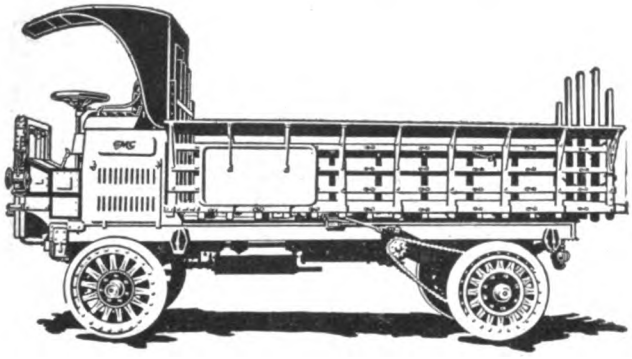
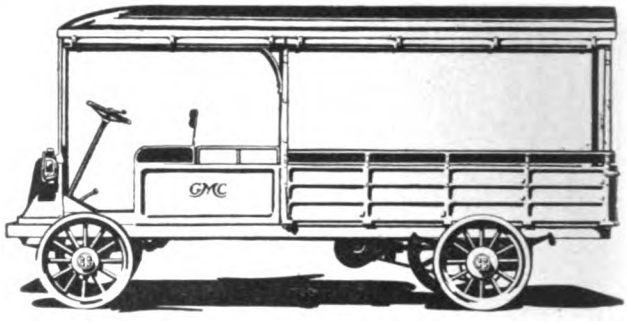


GASOLINE TRUCK—BREWERY BODY
Model K—5 Ton Capacity, Price, Chassis Only, $4400



ELECTRIC TRUCK—EXPRESS BODY
Model 3—3000 lbs. Capacity, Price, $1700, Chassis Alone, Batteries and Bodies Optional.

GMC Trucks have introduced to the business world the first comprehensive line of commercial motor vehicles, including both gasoline and electric cars, and covering capacities of from 1000 pounds to 6 tons. The completeness of the GMC Line gives this company a distinct position and a unique importance to the prospective installer of motor delivery or hauling equipment.

We are in a position to recommend, without bias toward either gasoline or electric power, the sort of vehicles best suited to your particular requirements. We are in a position to furnish complete delivery equipment covering any and all desired branches of delivery or hauling, standardized under a single manufacturer and with a single center of responsibility and service.

The comprehensiveness of the GMC line enables this company to fill the future as well as the present needs of its patrons.

GMC Service is provided for by a separate and distinct Service Department, under a General Service Manager. Each local GMC Service Station is in charge of a Branch Service Manager, who is directly connected with the General Service Department.

This Department in turn has behind it the engineering, operating and financial resources of General Motors Truck Company to insure prompt, complete and permanent service to every owner of a GMC Truck.

Our Service Department gives, where desired, before-sale assistance in studying individual requirements and recommending thereupon the proper types and sizes of trucks for any or all branches of work.

A manufacturing and operating experience of ten years in both gasoline and electric trucks is combined with the most efficient organization in existence to apply the proper types of motor transportation to the requirements of any business. We invite the presentation to us of any delivery or hauling problem. We will make analysis and recommendations without charge or obligation.

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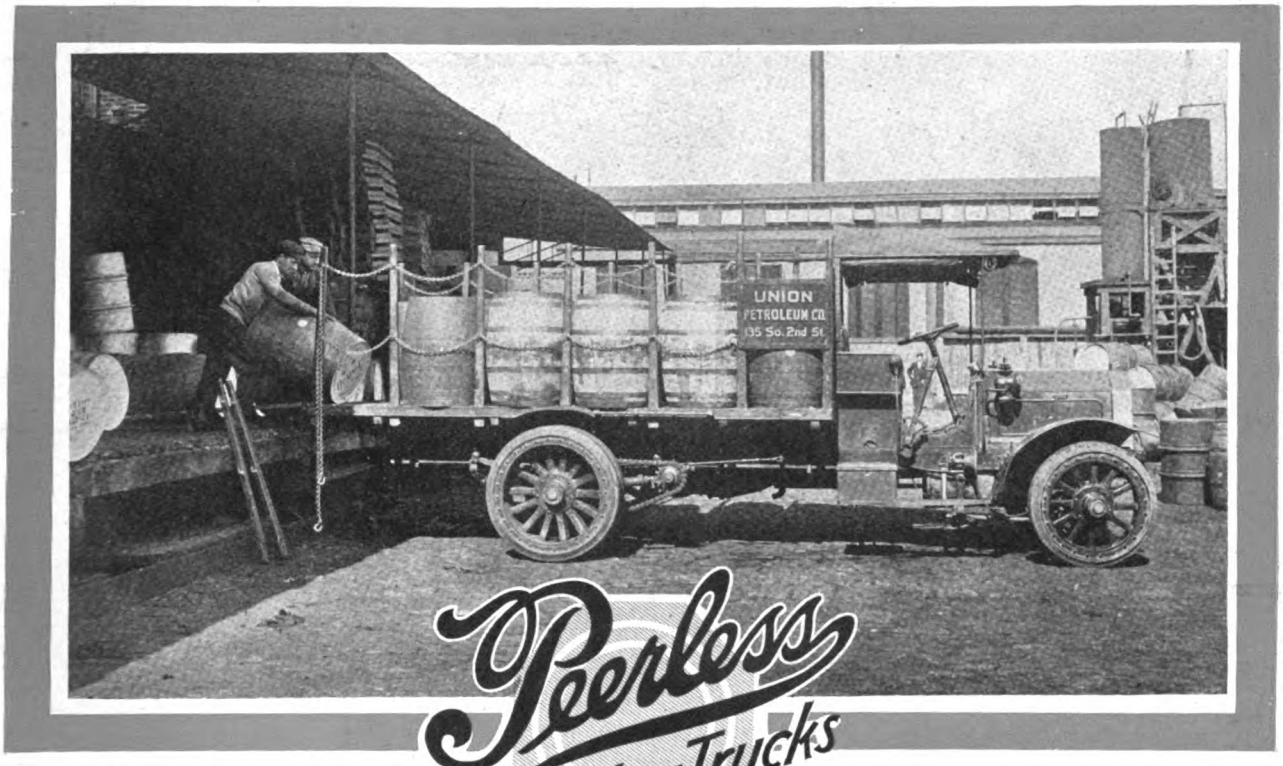

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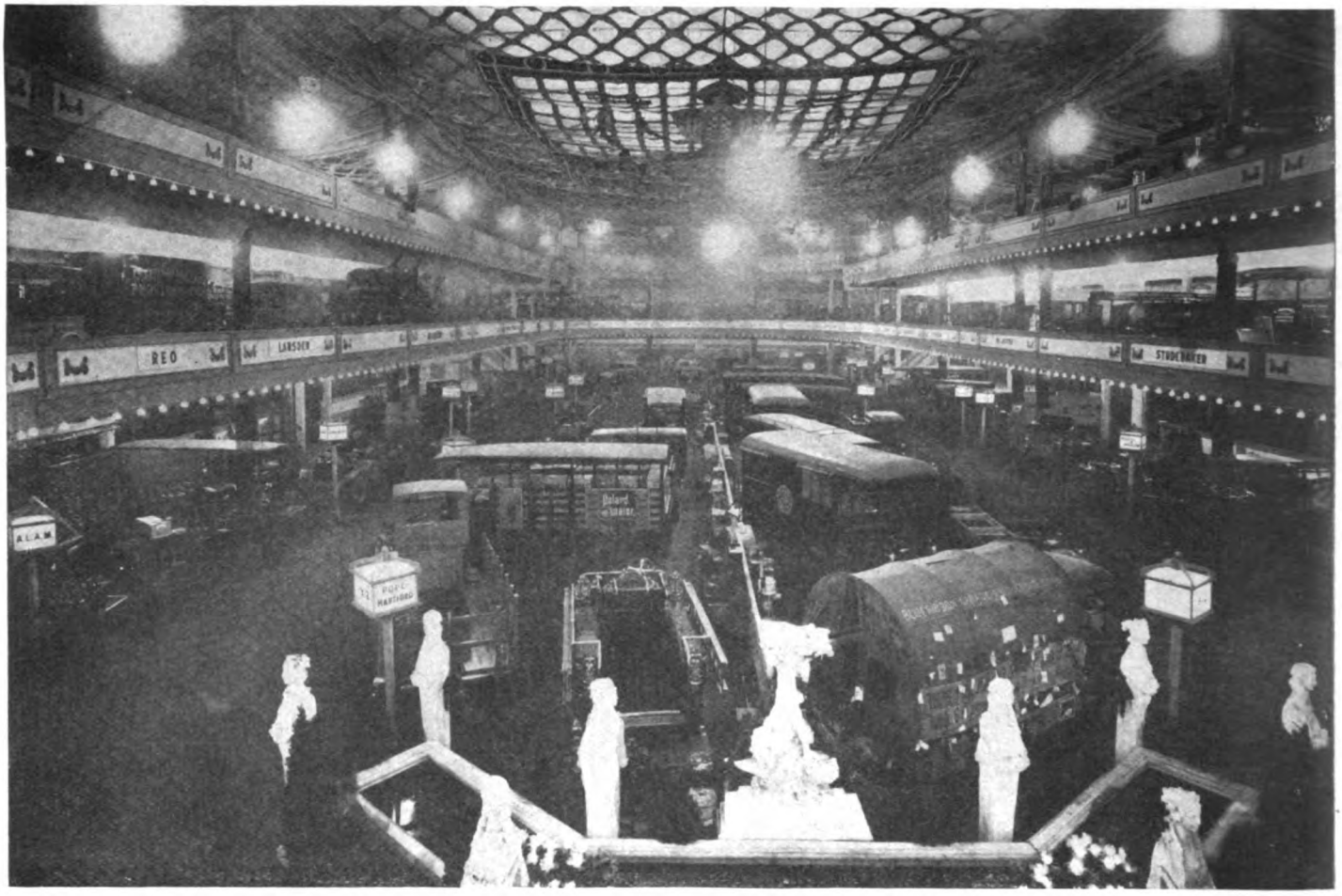
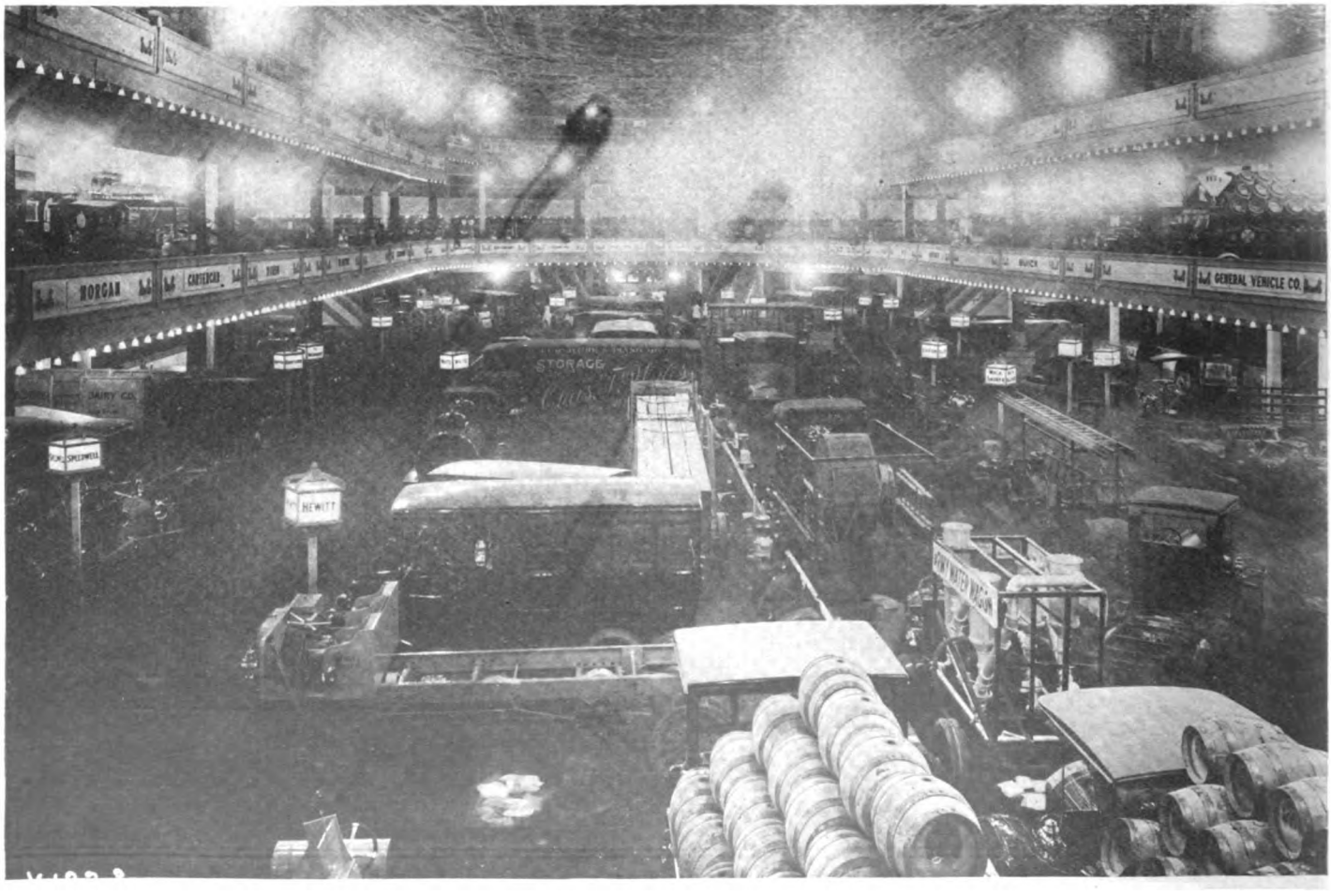


View of the New York "Garden" Show, looking east.



View of the New York "Garden" Show, looking west.

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Loading and Unloading Devices.

A Paper Read Before the 1912 Annual Meeting of the Society of Automobile Engineers.

By EDWARD W. CURTIS, Jr.

WITH THE constantly increasing sale of motor wagons the demand for auxiliary loading and unloading devices has developed a variety of contrivances, good, bad and indifferent, which are to be obtained readily all over the country. Expert discrimination, however, is generally required to correctly select and adapt the proper device to the work in hand.

As long as the horse held undisputed sway, auxiliary loading or unloading devices were looked upon merely as labor-saving helps and the consequent economy was only subconsciously considered. The hand winch, crane, grab bucket and hand truck were frequently found where the teamster or terminal was sufficiently wealthy to afford them, but were always looked upon more or less as luxuries. Such devices, however, reduced the manual labor and increased the availability of the truck, particularly in coal yards, stone yards, quarries and building excavations. In the last mentioned case it was not unusual to see teams driven into an excavation, loaded, and with more or less difficulty assisted out of the hole. In recent years, however, the teams generally load on the street at a chute or hopper, the material being elevated by means of a grab bucket or car and derrick. Most of the saving effected by this change of method is in manual labor, as at best the horse can do little more than under the older plan.

Singular as it may appear and contrary to horse practice the great majority of power wagon owners commence tabulating the performance of their machines from the day they enter service. Mileage is the average man's unit for performance, and this in the motor wagon, especially the gasoline truck, on account of its high speed, is so far beyond horse performance that he is highly pleased with the results. Eventually he begins to accumulate operating costs; later his maintenance expense comes to his notice; and in some cases we know that the owner has persuaded himself that the motor wagon is not only uneconomical, but extravagant, and consigns it and his investment to eternal damnation without giving it a fair trial by a competent jury.

This is not the broad minded business man, accustomed to working out the hard problems of business. The average business man discovering such a situation would first investigate the conditions himself and then call in the manufacturer of the machine for a proper solution of the trouble. Such a conference usually develops either excessive speed, supposedly demanded of the truck to show economy, or long periods of idle time, or both. In many cases the transportation engineer would straighten this out by rearranging the delivery service to conform to motor wagon practice, re-routing, introducing necessary schedule changes, and possibly some auxiliary means of loading and unloading to reduce the standing time of the truck to a minimum. When the last named is determined upon, a careful analysis of the operating conditions becomes necessary properly to determine what best to recommend.

Numerous devices are in common use throughout the country, and the following are likely to be found in any of the large cities:

LOADING.	UNLOADING.
The hopper,	Dumping body,
Chute,	Chute,
Pocket,	*Crane,
*Grab bucket,	Hand truck,
*Crane,	Portable cage,
Hand truck,	*Winch.
Portable cage,	
*Winch.	

Those marked with an asterisk can be power-operated.

Dumping Bodies.

Great variety exists in dumping bodies, and there is good reason for this. Hard coal, for instance, can be readily dumped at an angle of 15 degrees, while soft coal (particularly if it has been carried any distance over rough pavements and had opportunity to pack) requires an angle of at least 45 degrees. The same conditions apply to gravel, dirt, sand, snow, garbage, ashes, and crushed stone. This accounts in large measure for the variety of domp bodies offered.

There is, however, another consideration which is important—i. e., ability to manipulate a motor wagon in narrow alleys or congested places. This condition must indicate whether a side or end dump is required, whether the body must be elevated and dumped, or whether it may be tilted. The hopper body is hardly permissible on the gasoline chassis, but can be adapted easily to the electric chassis by arranging the battery forward and back of the hopper bottom.

There are so many well developed dumping bodies made by wagon manufacturers who specialize on this work that a great variety of bodies may be obtained, independent of the chassis manufacturer, at very small cost.

Practically every coal yard handling hard coal is equipped with coal pockets, so that loading is speedily accomplished. Where soft coal is handled it is seldom possible to load the machine by this method, although the chute is in use in some places. The usual method is to shovel the coal out of a car or off the ground into the truck. The driver is expected to do this, and at times gets assistance from a fellow driver, but is usually required to repay this obligation in kind. This limits the operation of the truck to the capacity of the man, which is one of the factors in connection with motor wagon operation that frequently spells failure for the machine.

A portable electric jib crane with a grab bucket has been especially designed to overcome this condition, and it is estimated that its operation will permit the motor wagon to do three times the work it can do under present conditions. Nearly every sand pit or pier is equipped with a grab bucket of some kind, the loading being either directly into the truck or through a large hopper, from which the truck is loaded. This same condition applies to gravel, broken stone, etc. All of the above methods of loading contemplate some form of dumping body to accomplish quick unloading.

* * *

The Quick Loading Hopper.

There is one other method of quick loading that is not widely known, but serves its purpose very well. It contemplates a device, made by the Quick Loading Device Company, consisting of a steel hopper which can be hung over the side of a gondola car. Men constantly shovel the material into the hopper; the truck runs under it; the hopper is dumped and the truck pulls away with its load. Many of these hoppers can be used on the side of a car and keep a pretty good fleet of trucks moving.

* * *

The Jib Crane.

The crane has long been used for loading heavy materials, but now comes into use in smaller form for handling general merchandise from the ground to the truck and back to ground or platform. This contemplates the small jib crane mounted on the truck. Very little power is required to operate this, as the life is usually short and the speed slow.

* * *

The Portable Electric Crane.

The portable electric crane fills a long-felt want in the handling of merchandise by motor trucks. Many of the com-

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modities which are put up to the power wagon today are heavy, bulky and awkward to handle. Much time is consumed in getting these on and off the machine. The portable electric crane does this work with ease and dispatch, the saving in labor varying from two to eight men. This device gives the advantage of placing the load exactly where it is wanted, and no further movement is necessary until the next operation.

* * *

Cage or Rack.

Some use has been made of the portable cage or rack, but it has not been adopted as generally as it should be. In most cases where it is in use the actuating influence has been some insurance regulation prohibiting gasoline trucks inside a building, or some such equally non-commercial reason.

In the case of the department store, for instance, that is compelled to load its wagons at the store, much valuable time might be saved by loading, listing and routing the merchandise in a rack of this kind in the basement of the store, and sliding the whole load into the wagon without waste of time.

The adaptability of this device in the case of the laundry, grocery, market, dyeing and cleaning establishments, printing houses and dozens of other lines would very materially increase the serviceability of the motor wagon.

* * *

Hand Trucks.

Similar economies may be obtained by the use of various kinds of warehouse and factory hand trucks, having these loaded in advance of the arrival of the motor wagon and immediately pushed aboard. In this way a 5 ton load of miscellaneous merchandise is put on the machine by a large Chicago house in 5 minutes at the most, while putting on piece by piece would consume 30 to 45 minutes. The same economy obtains in unloading if the shipping clerk has used any discretion in placing the small trucks.

* * *

Winch.

We must not overlook the winch, either hand or power driven, the latter preferably, because it is much quicker and cheaper, as in pulling a heavy load the hand winch requires two men, and sometimes more. The safe mover is a good example of this, the power winch on whose truck is also used as a hoist. For loading and unloading heavy and awkward loads the power winch is indispensable. Cases of 700 pounds to 1,000 pounds can be handled well by two men, whereas without the winch five to six men would be required. Another point: A motor truck equipped with a power winch need never get stuck in the mud, as the operator can make fast to a convenient tree and pull himself out with the winch.

* * *

In Conclusion.

It is a question whether the greatest saving is to be accomplished on the loading or unloading end. In my judgment, the portable body in all its forms, where it can be used, represents the greatest economy for the motor truck. Men in many lines of business are familiar with this method of handling merchandise. The lumber yard uses duplicate lumber wagons, one loading while the other is delivering a load. Some coal companies follow this practice; and here and there we find similar adaptations of the idea. The closer to continuous operation the greater efficiency.

Not infrequently, when a carefully worked out plan of operation, contemplating the use of auxiliary loading or unloading devices, is submitted to a prospective purchaser, showing the possibilities of the motor truck, he radiates an entirely new idea, all his own, to the effect that he can do this same thing with his horse equipment. But there he is wrong. The horse cannot work continuously; he must have his periods of rest; lengthy loading and unloading give him just that opportunity. Moreover, the horse driver also needs his rest periods; he gets these while the horse is working. But the motor truck does not need the rest; and the driver, through the advent of quick loading and unloading devices, does not do as much work, and consequently does not need the same rest periods. The merchant will learn these points if he attempts to apply motor truck methods to horse equipment.

Next to the portable body, the jib crane represents the greatest utility, and it is remarkable that we do not see it in general use. The cost is trifling, the power consumed not of consequence, and the utility unlimited.

The dumping or tilting body will always be with us in as many forms as we have it today, or more.

When the use of auxiliary loading or unloading devices is indicated, we usually find an individual problem to solve. After determining the best contrivance for the commodity to be handled, it frequently becomes necessary not only to install this new machine, but to rearrange or educate the different departments affected in order to accomplish the purpose intended. This must be accepted as a legitimate part of the work of the transportation engineer, and the success of the whole can be guaranteed only in this way. Careful study of the application of auxiliary loading and unloading devices will develop a quick perception of their utility. To get the best results the individual work characteristics should be considered thoroughly by the transportation engineer; and after determining the best device for the particular case, great care should be exercised to assure its proper application by those who handle it. Otherwise the economy predicted may never obtain. It will be well to take into consideration the maximum daily ability of the driver, in order to determine an economical day's work for the machine.

The employment of new devices or new uses for them will unquestionably increase the utility and sale of power wagons, and should be given all the publicity possible. There is an excellent opportunity for the ingenious engineer who will devise new means of loading or unloading motor wagon merchandise. He should have in mind that the power plant of the machine may be utilized to good advantage; also that it is usually desirable to restrict the truck crew to one man, as the economy of the motor wagon depends largely upon the saving effected in payroll. As in some other branches of the business, a freer distribution of knowledge would help the cause greatly, and is to be recommended.

MAIL MOTOR IN WILMINGTON, DEL.

A recent dispatch from Wilmington, Del., states: "The rush of Christmas mail at the local postoffice prompted the postoffice authorities to place a motor wagon in service. Assistant Postmaster Hickman went with the car and 42½ miles of streets were traversed in the collection of mail. The time made was 6 hours 27 minutes, the machine stopping to tap 278 boxes. Four trips were made from the postoffice, averaging less than 1½ minutes to each box. Only 4½ gallons of gasoline and 1½ quarts of oil were used by the machine.

The motor wagon worked against considerable odds, the weather being inclement, rain and snow falling part of the time. The streets were slippery and very muddy in outlying districts, but the car came through without mishap and did the work it would have required three teams to accomplish.

A noise proof motor ambulance has been installed by Bellevue Hospital, of New York City.

St. Peter's Hospital, of Albany, N. Y., has installed a 40 horse power motor ambulance.

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Motor and Transmission.

A Paper Read Before the 1912 Annual Meeting of the Society of Automobile Engineers.

By EUGENE P. BATZELL

JUDGING from the motors used now for practically identical vehicles and for the same service, one must believe either that in one case the motor power capacity is greatly underrated, or that it is overrated in another. For example, taking the motor wagons of 6,000 pounds carrying capacity of different makes, they will show the greatest variety in motor sizes, from 230 cubic inches up to 570 cubic inches piston displacement. Taking account of the existing difference in the weight of the vehicles proper, and also transferring the piston displacement to an even piston speed, the above figures would indicate that the several motor wagons require, from their makers' standpoint, from 21 cubic inches to 38 cubic inches piston displacement for each pound of total weight—vehicle together with rated load. The difference noted is practically 80 per cent. There can be no doubt that this cannot be caused through constructive features only, which leaves open the question which size is correct, especially considering the general economy of the vehicle, including its purchase price, service performance, maintenance, etc.

Any load can be carried over any road with a small motor, or with a big one, as long as there is sufficient traction at the driving wheels and a proper speed ratio between motor and the wheels. The smaller motor would take more time to accomplish the work, one of the points to be considered when choosing motors for some service requirements. The requirements might be such that in some cases it would be fully justifiable to use a smaller motor for the sake of general economy, increasing inversely with the size, so long as the road and load conditions are light, with little chance of taxing the motor to its capacity in power development, or doing so but for a short time, which could not affect perceptibly the general result in service efficiency and promptness. When more severe conditions are expected to be dealt with, then it would seem proper to select a larger motor. Introducing such difference in motor sizes in power wagons of the same make and capacity is apt to evoke objections, but it should be borne in mind that a decrease of the motor size below that which could be used well only in extreme cases of service conditions means a great saving for the purchaser and owner. In fact, it is advisable to install in a given power wagon the smallest motor which is capable of rendering the service with best economy under the average prospective conditions, taking into account the time required versus the saving in initial and running cost, etc., as compared with the larger motors.

* * *

Fuel Economy and Power Required.

When studying motor characteristics, particularly the fuel consumption curves, one notes that the minimum of the latter lies at comparatively high speed, 800-1,200 r.p.m., depending on the construction and type, but action with full throttle opening only being considered. From the standpoint of fuel economy it would seem best to have the motors running at all times with wide open throttle and at a speed approximately equaling that of their corresponding minimum in the fuel consumption curve. The revolutions per minute frequently employed in practice for the rated normal vehicle speed favorably approach the above figures of most economical motor speed. This would assist in approximate figuring of motor size, because it imposes a limit upon its desirable speed. For instance, suppose that the easiest conditions to be figured on in a prospective service offer a tractive resistance of about 20 pounds per ton of weight; in the case of an empty vehicle this would require a moment at the driving wheels of 36 inches diameter, of $20\times3\times18=1{,}080$ inch-pounds. Should the motor speed be limited to 1,000 r.p.m. and that of the car to 15 miles per hour, the required highest ratio between the motor and the wheels will be about 7, which figure is often found in practice for direct drive. With a mechanical efficiency in the drive of 65 per cent, the necessary motor power can be

$$\frac{1080\times2\pi\times1000}{7\times.65\times33{,}000\times12}=3.75 \text{ hp.}$$

Similarly when the machine is carrying its rated load of 6,000 pounds over average roads with a tractive resistance of 40 pounds per ton and at a speed of 9 to 10 miles per hour, its required drive ratio would be about 10, if the motor revolutions per minute are somewhat lower than 1,000. The motor power at the same time is

$$\frac{40\times6\times18\times2\pi\times900}{10\times.65\times33{,}000\times12}=9.5 \text{ hp.}$$

The last figure should disclose the great lack in general economy when motor wagons of the above type are equipped with motors rated at 30 to 50 hp. at 1,000 r.p.m. Less than one-third of this power is necessary during most of their runs, which means that the motors are strongly throttled and accordingly work with very low efficiency.

* * *

Relative Cost and Operation Economy.

This does not mean that the above figured small amount of power can never be overstepped, but most of the encountered greater tractive resistance, other than the one taken in consideration here, should be taken care of by provision of a sufficient number of speed ratios in the transmission. It would be most economical to sacrifice the motor size for the sake of gaining a trifle in the transmission construction, its cost and simplicity of operation. In the long run it is more economical to have an economically working motor with experienced drivers.

In the former example the greatest tractive resistance should be assumed at 100 pounds per ton with the machine ascending a 10 per cent grade under full load. The vehicle speed during those abnormal conditions might well be reduced to 1½ miles per hour. This lowest possible speed generally is to be determined by the character of the service in each individual case. The motor speed should be about 800 r.p.m., which gives the drive ratio at this moment equal to 57, or about twice lower than present practice. The motor power required during this run is

$$\frac{(100\times6+1200)\times18\times2\pi\times800}{57\times.65\times33{,}000\times12}=11 \text{ hp.}$$

A motor of about 200 cubic inches piston displacement is ample for the above example, and its dimensions could be taken as any long stroke combination, for instance 3½ inches by 5½ inches. 4 cylinder, 4 cycle. The fact that this calculated piston displacement closely approaches the smallest one in use at present, as cited before, should give a certain confidence in it, namely, that it is not actually too small, perhaps due to miscalculating it here with overlooked points of importance.

A revision of most of the present power wagon motor sizes would seem timely, especially if the increased economy of their service is anticipated to extend the field of their use. This revision should be carried out with the object of reducing the motors to the economical limit of each individual service case. It might affect the drive transmissions also, introducing a greater number of reductions and probably lowering the final largest ratio.

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Worm and Gear Drive.

A Paper Read Before the 1912 Annual Meeting of the Society of Automobile Engineers.

By RALPH H. ROSENBERG.

TO MY knowledge there has been no thorough research the result of which, if disclosed, would throw light on the subject of worm gear drive and clear the haze of mystery now surrounding it. The following remarks outline briefly the results of the author's experiments:

First, I will state why I thought it necessary to seek as a final drive for heavy motor wagons and vehicles of that class a better means than side chain, bevel gear or internal gear. Bevel gear can be applied only when ratios up to 5 to 1 are sufficient; for ratios in excess of this the dimensions of the ring gear make it prohibitive, as the road clearances would be seriously interfered with. Assuming, for example, that a reduction of 8 to 1 is required, the standard bevel gear axle with a 4 to 1 reduction may be used, supplementing it with a 2 to 1 reduction between axle and transmission. This arrangement gives the desired ratio and proper road clearance, but has the disadvantage of a double torque load in the bevel gear construction, an undesirable condition difficult to provide for, and the power efficiency delivered at the wheels is less, due to the supplementary reduction. In the side chain and internal gear drive similar conditions are obvious, both embodying reductions carrying in their construction a multiplicity of parts and bearings, tending to reduced efficiency, and being productive of objectionable noises and increased wear. The worm and gear from a mechanical standpoint overcome the objections cited, having a single reduction and only five bearings, under load, and, if properly designed, should be superior in efficiency. The absence of complications in the process of manufacture, simplicity of alinement and assembly are self-evident.

* * *

Developing a Successful Design.

Consideration of these several features impelled me to a single conclusion, viz., that the worm gear is the most logical means of reduction, especially for truck construction. With the conviction that this was the correct principle, I determined to embody it in the design of a solid tired machine, employing a ratio of 7 to 1. Having acquired all the obtainable data, I regarded the task of application quite an ordinary matter. A worm and gear were made and tested with unsatisfactory results; others were substituted, procured from makers specializing in work of this character. The results were the same.

I immediately started a series of experiments for the purpose of eliminating the doubtful factors. This comprised a systematic testing of various metals, diameter of gears, shape and size of teeth, location and kind of bearings. Special care was exercised to obtain accurate results, which were recorded.

I summarized my conclusions as follows:

Material: for worm, semi-hard steel, fine texture ground and polished. Bronze gear burnished. Floating worm support. Rigid wheel support. Thrust bearing back of annular bearings. Straight side shapes of tooth. Several gears constructed in accordance with these data showed improvement in running efficiency, but the starting efficiency was low, due to improper lead angle. The most serious trouble was stripping the bronze gear teeth. It was, therefore, imperative to find an alloy capable of sustaining excessive pressure. In 1907 I succeeded in producing a metal possessing these qualities; employing a high grade phosphor bronze and adding a certain percentage of magnesium, the results were marvelous. A gear of this material showed double the strength of the metal previously used. It is susceptible to such a degree of hardening that it is exceedingly difficult to file, permitting the taking of a high polish, and therefore requiring less lubrication. The maker of the metal will guarantee a tensile strength from 105,000 to 110,000 pounds per square inch.

This troublesome obstacle surmounted, my attention was directed to the various phases of pitch and lead angles in tooth formation, as they are prime factors determining the starting efficiency. Ratios, lead and tooth angles were continuously modified, until satisfactory conclusions were reached, establishing a formula giving uniform results for ratios over 5 to 1. My contention is, and I have proven it empirically, that, first, the tooth angle and angle of lead or advance must coincide, and, second, that the advance angle fixes the diameter of the worm. It is determined by extending the lines describing the flanks of the teeth to points where the intervening distance is equal to the lineal pitch times the number of leads; the distance from these points to the pitch circle of the gear is the diameter of the worm.

I have adopted the following method for determining the width of the gear and face of the teeth. They are described by diverging lines from the center of the worm including an angle of 120 degrees.

Gears made according to this formula will permit a reasonable amount of variation between the pitch circle of the worm and pitch circle of the gear, the surfaces remaining complementary. This is not permissible with any other form and allows a certain latitude in manufacture. It is absolutely necessary, however, to maintain proper relation of the axes.

* * *

Cost.

I have heard it asserted by those conceding the utility and desirability of the worm gear that it was an expensive device. My endeavors to ascertain upon what grounds this assumption was made and what particular items entered into the consideration of cost were usually met by general statements. So I conclude that the cost of manufacture information, while not as vague as that relative to designing, is nevertheless indefinite. I take the liberty of quoting from E. R. Whitney's paper of June, 1911, relative to the cost of worm gear construction, wherein he states the worm gear drive is not a cheap device, and that the indicated efficiency and durability results cannot be expected unless the gears are properly designed, constructed of the best materials and accurately mounted on high-grade anti-friction bearings. I concede this statement to cover the essential facts generally, but on the question of cost take issue, believing the worm gear to be the cheapest form of final drive. It is admittedly true that proper design is essential to the success of any mechanism, but it does not follow that proper design will entail any expense over and above improper design, so far as it relates to the cost of manufacture. In my experience I have found that the materials used in the worm and gear are not more expensive than those employed in the bevel gear drive or the side chain drive, where double reductions are used. Furthermore, a distinction should be made between experimental work and work of actual production where the facilities are provided for executing large quantities.

In substantiation of my statement I give the following data taken from the records covering the cost of producing a worm gear and for a 5 ton motor wagon.

Steel for worm, $9.00; bronze ring gear blank, $18.00; timed machine worm, 2 hours; labor on worm rough turning, 2 hours; milling, 2 hours; grinding, 3 hours; ring gear turning, 3 hours; cutting, 1 hour and 10 minutes. The parts were then in condition for assembling.

Concerning the durability of the worm gear, I am in accord with Mr. Whitney, and can say that I have inspected gears after they have run 120,000 miles and found them in excellent condition.

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Construction of Solid Tires.

A Paper Read Before the 1912 Annual Meeting of the Society of Automobile Engineers.

By CHARLES B. WHITTELSEY.

IT IS uncertain when or where solid tires were first used for wheels on vehicles. However, the use of such tires was not common until after the year 1881, when the Carmont tire was first used on hansom cabs on the streets of London. Carmont's patent was: "A rubber tire held in rolled steel channels in a state of compression between converging flanges."

The next practical advancement in the development of the solid tire made in America was under the patent granted to A. W. Grant in 1896, later known as the Kelly-Springfield tire. This tire being seated in a rim channel with diverging sides, there was no loss of resilience from the compression of any part of the rubber. The channels were not as deep as in the Carmont type, and a larger percentage of rubber was available for wear. The rubber body was held in place by means of circumferential wires running through the rubber and forming circles of smaller circumference than the rim flanges. Since the introduction of the Grant patent the use of solid rubber tires has increased steadily.

The Victor tire was similar in shape and construction to the Carmont and Grant tires, but the retaining wires were incased in leather to prevent their cutting the rubber. Later on, these wires were covered with specially woven fabric.

The next patented tire which was developed to any great extent was the side wheel tire—a tire held in position by two endless circumferential wires sprung over the edges of the channel which engaged the ends of embedded cross bars, thus holding the tire securely in the channel.

These and many other solid vehicle tires were made and used on cabs, carriages, etc., until the vehicles became motor driven. The weight and speed of the motor vehicles increased as well as their carrying capacity, which made this style of tire altogether too light to perform the work required of it. This condition brought about the invention of the solid motor tire—a tire vulcanized in circular endless form to fit the dimensions of a wheel. This type of tire has been brought out in different designs and types, such as flange, internal wire, side wire, hard rubber and metal base types; also the demountable.

* * *

Construction.

Vehicle tires were made in oval shape, in cross section from ¾ inch to 2 inches, advancing one-eighth inch between sizes, and of compounded rubber which is forced through a tubing machine die, vulcanized in long molds with many cavities in the shape in which it has been designed. These tires were cut in lengths to fit the wheels and internal wires were inserted, of such lengths as to allow them to be spliced when applied to the wheel. The tires were then put into position in a channel on a wheel and held by mechanical devices while the ends of the wires were brazed together, the rubber having been pushed back, affording the wires sufficient space to allow this brazing process.

What is known as the cushion solid, which is perfectly round molded rubber in similar form, with a single hole through the center of same for retaining wires, was put into use about this time.

The construction of the solid motor tires that have been put on the market up to the present time is very similar in a general way. The rubber is forced through a die of a tubing machine, or built up from thin sheets of calendered stock in endless form to fit the exact dimensions of a wheel. The particular styles of base or tire retaining bodies have taken various forms, such as circumferential and side retaining-wires which are engaged over embedded cross wires, base of hard rubber in various forms, also of semi-hard rubber which can be molded into the tire, and more recently, the plain metal base types which are most successful.

The rubber portion of a solid motor tire is usually about 2¾ inches high, and varies in width according to its design. The tire is built so that when it is applied over the steel band of the felloe of the wheel it fits so snugly that it has to be forced on with a press specially designed for this purpose. This is done so that the tire will not creep circumferentially or laterally. When the tire is in position on the wheel, it is further secured by steel flanges bolted on each side of the wheel, also to prevent its creeping or working off the wheel.

The side wire motor tire is built in similar shape, but cross wires are inserted throughout the base of the tire at stated intervals. It is placed in a channel made for this purpose and side endless circumferential wires are applied on each side of the tire over the ends of the cross wires in the base of the tire, which holds it in position in the channel. The tire in the channel is applied to the wheel over a wood or steel band on the wheel.

Metal base tires are built up of compounded rubber in graduated consistencies from the hard base which forms their inside circumference next to the steel base to which it is vulcanized, to the resilient rubber that forms the wearing part of the tire. This rubber tire is vulcanized to a steel tire band which is applied by pressure to the wheel over the steel felloe band with either a hydraulic or specially built press. It requires from 60 to 90 tons pressure to apply these tires to a wheel and it has often been found necessary to use more than 90 tons to remove tires so applied. This frictional contact makes it unnecessary to use any side flanges or other fastening.

* * *

Size and Shape.

The size, shape and dimensions of these types of tire are varied according to the designs of the manufacturers—no two being the same in any of these particulars. The service obtained from a given diameter and cross section of these varied types of tires is as varied as the different types. The reasons for this can be attributed to the variation in the cubical contents of the cross section of the tire, some designs having a much greater amount of rubber than others, and, therefore, the distribution of pressure over the different sizes of tires caused by the intensity of pressure per square inch brings a greater or lesser area of the tire in contact with the road, and as it is only that part of the solid rubber tire which is in contact with the road that is carrying the load, the tire with the greater area at this point performs the most satisfactory service.

The height of the rubber from the tire seat governs largely its elasticity and cushioning effect. A tire too high and narrow cannot stand up under a heavy load. It will weave from side to side. A tire worn down to a short distance from its non-extensible base loses its cushioning effect, and instead of the uneven conditions of the road being absorbed by the rubber, the tire is hard and transmits the shocks of bumping over it to the motor wagon, and soon racks the machine and its motor, so that repairs become necessary.

* * *

Life of Tires.

The life, strength and durability of the tire lie primarily within the compounded rubber of which it is made, and also its construction. Other conditions being equal, the tire made of the highest grade of rubber has the longest life and is the most resilient. Certain minerals are added to give it strength and durability, the quantities being varied according to the

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best judgment of the tire manufacturer. The proper size tires, which are dependent on the speed of the vehicle, applied on an electric wagon driven at 8 or 10 miles per hour, will give greater mileage and much longer life than the same size tires on a gasoline machine driven from 12 to 15 miles per hour. The carrying of a ton at a speed of 10 miles per hour is a very different proposition to a tire than carrying the same amount of load at 15 miles per hour. Greater mileage can be obtained from tires run in a city devoid of grades.

Heat is the result of motion, and as the tire when in motion is continually being pounded between the road and the steel band of the wheel, it develops a greater amount of heat within itself, which is transmitted throughout the tire, and has a tendency to shorten the life of the compounded rubber. The heat developed in solid tires is much less in the fall and winter and spring of the year owing to the cold roads, water, snow and ice. The number of months' service, as well as the mileage, that a solid tire may give is influenced by the same conditions; also by the weight the motor wagon has to carry, the speed at which it is driven, and the nature of the country where it is used.

* * *

Driving-Wheel Diameter.

Tires on wheels of greater diameter give longer and better service, because of the greater area of rubber in contact with the road, as well as the fact that they do not have to travel so fast, and, therefore, do not generate as much heat, or deteriorate so rapidly. Neither do they travel so far and wear down as rapidly as the tires of smaller diameter. Actual experience has demonstrated that big wheels and tires are better on heavy grades in particular.

* * *

Tires for Electric Vehicles.

A solid tire for an electric wagon must be made from a compounded rubber stock which is soft and most resilient. It must absorb the unevenness of the road, and resume its normal shape instantly, so as to lessen the traction of the vehicle. By the absorption of the shocks the consumption of electric current necessary to drive the machine is reduced to a minimum. This is largely dependent upon the resiliency of the compound, as well as the shape and size of the tire.

Many shapes have been tried out for use on electric machines—the standard oval shape prevailing. The corrugated or grooved treads present less road contact and assist in preventing skidding. Tires molded with these grooved treads and undercut webbed sides afford an additional cushioning effect and are very successful on electric vehicles. The styles of tires used on electric vehicles are the same as those offered for other classes of vehicles. The size of the cross section also affects the cushioning qualities of the solid tire on electric wagons, and a fair comparison cannot be drawn between two makes of tires, one of which is approximately 8 square inches in area for 4-inch section, and the other 10 square inches; for the one with the greater area will cushion and carry a greater load, absorb the shocks better, give longer life, and better service.

The life of the tire on electric vehicles is much longer than on gasoline machines—due partially to the low speed of the vehicle. From this class of vehicle being run at lower speed, it is handled with much more care than a high speed machine; therefore, unknowingly, the tires receive more consideration.

* * *

Dual or Twin Tires.

Dual or twin tires are applied on the rear wheels (and sometimes also on the front wheels) of power wagons built to carry heavy loads, and subjected to the most severe strains, as it is known that when these dual tires are of the proper size they have greater sustaining power from the distribution of the load over the two tires on a single wheel. However, it is frequently demonstrated that one of the twin tires gives out before the other—due to the fact that they have been driven over uneven roads where one of the tires on the wheel has had to carry the entire weight of its wheel a greater portion of the time and has given out from being overloaded.

* * *

Block Tires.

Block tires are sections of solid tires vulcanized to steel plates or held in position by steel sectional frame fitting over the blocks of rubber with a wider base, or protruding wires in the base. This style of tire is used principally in duals on the rear wheels of the larger power wagons subjected to most severe work. When driven rapidly, there is but little unevenness of motion felt from the tire being so constructed. The tire does not generate heat within itself as rapidly as a solid tire, owing to the fact that there is a space of an inch or more between the blocks, which enables the rubber to yield more as it rolls up ahead under the traveling load. There being no communicating rubber between the blocks, the heat is confined in each block.

Block tires afford a very good non-skidding quality, and are excellent on soft roads, as there is but little slipping in wet, slippery places. In winter the spaces between the blocks pack with snow and ice, and the tire then loses its non-skidding and gripping effect. In all seasons the block tire picks up stones between the serrations, and these small stones imbed themselves in the rubber, and should be taken out with a strong screwdriver or any other similar tool before they have time to cut and work into the blocks of rubber.

* * *

Demountable Tires.

The demountable solid motor tire has been too long delayed. The cost to the tire manufacturer, motor wagon manufacturer, and owners of machines, of the delay of laying up the motor wagon while the wheel is taken off and sent by express for a new tire, is entirely too great. This expenditure of time and money will be avoided when the tires are all demountable and interchangeable like pneumatics for the pleasure car.

The greatest of solid tire troubles is the separation of the tread from the base of the tire before the tire has given satisfactory mileage. While some of the troubles have been due to the construction of the tires, the principal causes of trouble have been overload and overspeed. The motor wagon manufacturers have not equipped their machines with tires sufficient in size to do work demanded of them. The tendency is to underrate the overload that is going to be put on the truck soon after it is turned into service, just as in the case of pleasure cars until recently. Sufficient allowance has not been made for the portion of the load that is carried on the rear wheels, and power wagons are daily equipped with undersize tires that will go to pieces within two or three thousand miles instead of lasting six or seven thousand miles. Manufacturers will some day learn that the reputation of their machines for "eating up tires" costs them more than the difference in cost between undersized and proper size tires—a great many times over.

Standardization.

This point leads to the standardization of the tire and wheel dimensions and fastenings, which was accomplished by the Society of Automobile Engineers on July 15, 1911. What does this mean to the tire manufacturer? The expenditure of thousands of dollars to make an entirely new equipment in which to make his solid tires to conform with the new dimensions that the S. A. E. standardized. What does this mean to the wheel and truck manufacturers? A saving of thousands of dollars, instead of having to carry as many wheels in stock as there are varieties of tires to fill an order for any given size. The S. A. E. standardization has reduced this to one wheel for any make of tire for any given size.

The time will come when the cubical contents of the tire will be standardized, also the demountable fastening, so that the difference in service of any given size tire will be measured by the difference in the quality of the compounded rubber that it is made of by the different tire manufacturers.

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The Electric Power Wagon.

A Lucid Exposition of Its Many Advantages and Logical Place in Road Transportation.

By GEORGE H. JONES, Power Engineer of the Commonwealth Edison Co., Chicago.

WHATEVER else may be said about this progressive age of ours, it is certainly true that we are living in a period in which more and more of the work of the world is being done by machinery.

It is only a comparatively short while, as time goes, since machinery, in spite of intense opposition, was first introduced into our commercial life. Now it has been adopted by practically every industry and we are familiar with the remarkable results obtained.

In view of this success, it was natural to look forward to the use of mechanical power in connection with matters of transportation, and, as a consequence, the forerunner of the present steam locomotive was evolved. Here again strong opposition developed, and at that time the opinion of the majority of people was that the idea of railroad transportation was entirely visionary. The splendid achievements in the field of railroading are now a matter of common knowledge. This great success undoubtedly inspired inventors and engineers with the idea of applying mechanical power to street transportation, and as one result we have the perfected street railway systems of the present time. Once again we find the efforts of the inventors and engineers rewarded with great success, and have another practical demonstration of the superiority of modern mechanical power over animal power heretofore in use since the beginning of time.

The universal application of motor wagons will practically double the available thoroughfare in congested traffic areas such as this, which is a daily scene on South Water Street, one of Chicago's busiest markets. The difficulty of maneuvering horse drawn wagons into place will also be obviated.

The next logical step was to apply this new power to ordinary street transportation to supplant the horse. Attention along this line was first directed to the pleasure vehicle with the result that the horse and carriage have been practically driven from our city streets. The same success is bound to attend the introduction of the power wagon. While probably the horse will never be entirely supplanted, there is no doubt at all that by far the largest part of our street transportation, especially in the case of large cities, will be done with mechanically equipped vehicles to the great advantage of everyone. The merchant and manufacturer will be enabled to make quicker deliveries at lower cost, thereby benefiting the public as well as themselves, and furthermore, the public will be generally benefited by less congestion in the streets and better sanitary conditions resulting from the elimination of the horse.

The superiority of the power wagon over the horse having been already demonstrated by actual experience, the next question to be considered is the general type of machine to be used.

As this is undeniably the age of electricity the natural thing is to investigate its application in this field. Electric power has already supplanted every other kind of power for street car use. It is now firmly established in interurban transportation, and undoubtedly will in the future very largely supplant other forms of power for trunk line railways. This being the case, the natural supposition is that it will also be well adapted for power wagon work, and actual experience has already proven its adaptability and also its expediency.

The electric vehicle, both pleasure and commercial, is in a class by itself and renders service which is impossible to obtain with any other form of power.

During the last few years many improvements have been made in motor equipment, in the storage battery, and also in the general design of the electric vehicle, and besides this the rates for electricity have been greatly reduced, so that now the electric vehicle is a thoroughly dependable piece of apparatus which can be relied upon to render the best service at low cost. Among its many points of merit might be mentioned:

(1) The simplicity of the mechanism and the freedom of the reciprocating parts, thus very largely eliminating trouble due to wear.

(2) The ease with which the vehicles are controlled,

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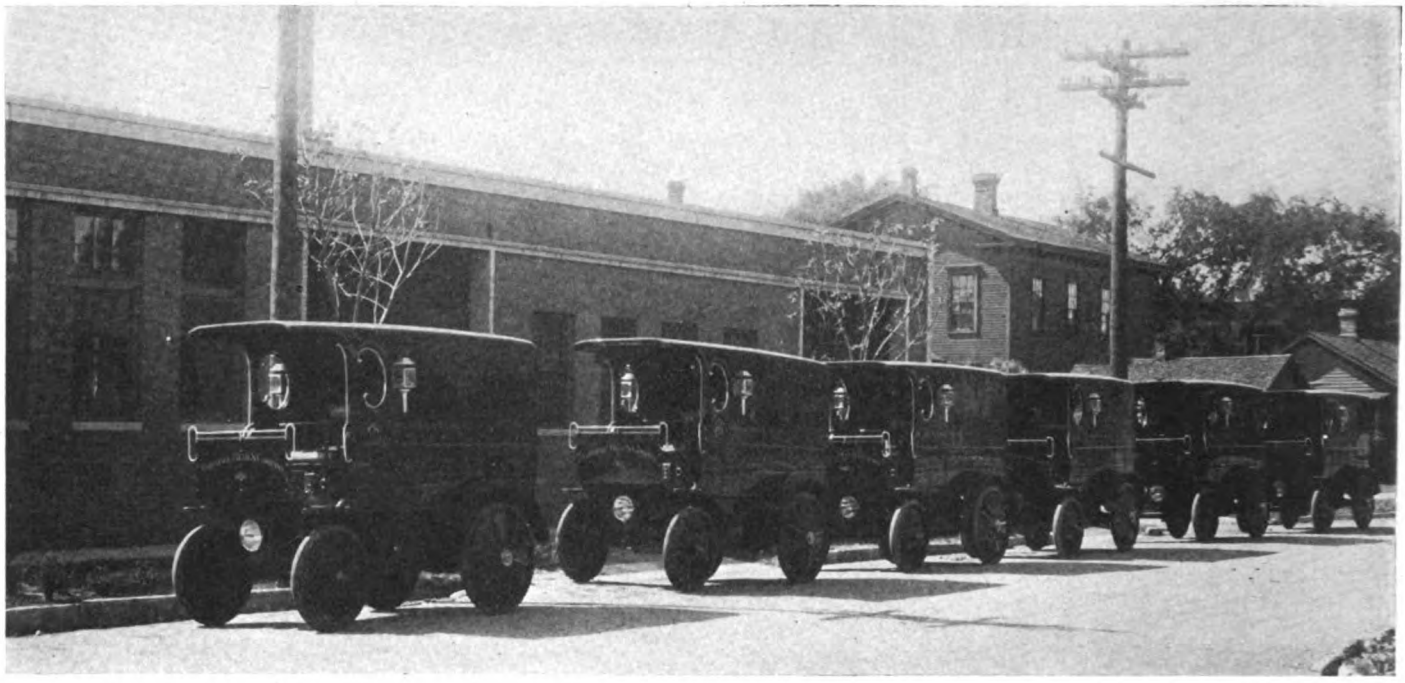

Six of the 20 electric wagons which are giving a splendid account of themselves in the service of Marshall Field & Co., Chicago.

thus making them especially adapted for use in the congested city streets.

(3) Absence of fumes which are likely to damage goods being transported.

(4) Absence from noise.

(5) In the case when frequent stops are necessary, especially on the city streets, there is no loss of power while the vehicle is not in motion.

(6) The electric vehicle can be run on docks and kept in buildings without raising the insurance rate, for in many classes of buildings the use of other forms of power wagon would materially increase the insurance rate for the entire premises.

(7) The electric vehicle does not need an experienced chauffeur or a licensed engineer, as any intelligent person can in a short time learn to operate it satisfactorily.

(8) The elimination of abrupt starting and stopping reduces wear on tires.

(9) The electric truck can readily be equipped with auxiliary apparatus, such as electric winches, etc., and can thus be used to great advantage in many special lines of work.

One frequently hears the old saying: "The proof of the pudding is in the eating." This is especially true in the case of the electric truck, as most of the large representative business concerns of the country are now making wide use of this class of vehicle after having started on a small scale a comparatively short time ago. The Commonwealth Edison Company about twelve years ago put in service nine electric wagons, and has since been giving the matter of the electric truck very careful attention. This service has been gradually increased, so that now the company operates 44 electric wagons, is about to purchase 25 more, and will purchase others from time to time until its horse service is entirely replaced. The Commonwealth Edison Company is not taking this action on account of sentimental reasons, but because of the fact that carefully compiled data over a period of ten years show that the electrically operated vehicle renders superior service, and at the same time effects a very material saving over other forms of transportation.

The electric truck is now coming into its own. The work of the early pioneers in this line of activity is bearing full fruit, and there is every reason to believe that the use of the electric power wagon will now be very greatly extended in all parts of the country. The manufacturers, the large business houses having extensive transportation problems, and central station managers are coming to fully realize the great possibilities of this modern means of transportation, so that its future is assured.

BIG BANQUET IN CHICAGO.

Plans have been completed for the biggest automobile banquet ever held; this will be given at the Hotel Sherman in Chicago on February 1 by the local Automobile Trade Association. All of the largest automobile manufacturers in the country are expected to attend. Covers will be laid for at least 250 at $10 a plate. Mayor Harrison has been asked to be one of the speakers. Among other prominent speakers will be Henry Ford, Benjamin Briscoe, Hugh Chalmers, R. P. Hooper, Charles Clifford, W. J. Mead and Charles E. Gregory, president of the Chicago Motor Club. David Warner of the Thomas Motor Company has been named chairman of the committee.

ANOTHER MOTOR BUS LINE.

A motor bus service has been established between Sharptown and Salisbury, Md., a distance of 19 miles. The route includes Mardela and Hebron.

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Motor Wagon Design.—I.

Introduction to an Article Discussing the Present Status of Design as Represented by 400 Models.

WHILE THERE are a few isolated cases of motor wagon design that obviously will not last, even in the light of present experience, the comparative uniformity in design that already obtains is really surprising, considering how recently the industry has come to be regarded seriously by the business interests of the country. In great part this is due to the confidence that the power wagon's performance for the past few years has created in the minds of big companies which rely wholly or in great part upon their transportation facilities. This confidence has resulted in the placing of many orders for massed installations, where the motor wagon's economy is the most decidedly marked. Fifty at a single order has become so common as to evince hardly more than a ripple of trade excitement, while a recent order for 200 machines by a single company was accepted so complacently by the manufacturer that only the barest mention of it appeared in the public press.

* * *

Whether this state of affairs is to be regarded as a reason for strict adherence to the prevailing type for some years to come, is a matter that only time will show. The present treatment deals with the design of motor wagons as they appear listed in the specification tables which are complementary to this article and which appear in another part of this issue.

* * *

The "Power Wagon's" tables include nearly 400 models, gasoline and electric, of all load ratings. While not quite complete, they are very nearly so and certainly are representative of the entire industry. In load rating they cover every variety of machine made, between 500 pounds and 20,000 pounds. The chassis prices range from $600 to $6,000. Surely a variety big enough to suit every need and every pocket book.

* * *

The tables present a wonderful study. In the gasoline motor wagon classes there are 80 parallel columns of details pertaining to each and every machine. In the electrics there are not so many, for obvious reasons. Even these are not complete. Such matters as bearings have been purposely omitted, not because they are not important, but because their inclusion would have made the tables so bulky as to become unwieldy. Bearings, however, are practically standardized by well known parts manufacturers, and their exclusion, therefore, will not greatly matter. Any machine which is worthy to be placed on sale must have good bearings—usually of the roller or ball variety, as may be preferred in particular cases. This and some other matters will be taken up in later issues.

In the March number of the "Power Wagon" the prevailing designs will be discussed in detail.

(To be continued.)

TRYING TO STOP PROGRESS.

The Funeral Directors' Association of the Falls Cities, Louisville, Ky., recently suspended a member for installing a motor hearse. The member in question had made a careful study of existing conditions and found that the installation of a motor hearse was absolutely essential to the economical transaction of his business. He stated in an interview that the time has arrived when a motor hearse is as much a necessity to the undertaker as it is in any other business depending largely on transportation.

GOOD WORK BY MOTOR PATROL.

According to the monthly report of the police patrol sergeants of Wilmington, Del., the new motor police patrol made 277 calls, carried 323 people and traveled 412 miles during the month of December. The total mileage is about 100 miles more than the machine made during the month of November. It was declared by the commissioners that the motor patrol had demonstrated its worth many times since it has been placed in service.

ASSOCIATION MERGER.

The Chicago Automobile Trade Association and the Chicago Truck Dealers' Association were consolidated on January 8 last, the latter organization being merged into the former. The motor wagon members will form a regular subdivision of the main association, with officers of their own, and will hold special meetings from time to time in order to boost the power wagon end of the automobile industry in the local field.

CORRECT SPEEDS FOR MOTOR WAGONS.

According to H. B. McGinley, president of the Veerac Sales Company, the limit of speed for a 1,500-pound motor wagon should be 15 to 18 miles an hour, and 6 to 8 miles for a 7 to 10-ton motor truck, other capacities being intermediate between these speeds.

NO MORE HORSE BUSES IN CHICAGO.

With the installation of four new electric buses between the State street stores and the Northwestern depot, in Chicago, the horse bus proprietors decided to give way to the new idea and retire from business. Now Chicago, like London, is without horse buses.

N. A. A. M. HAS TRUCK DIVISION.

During the first week of the Chicago Automobile Show, the N. A. A. M. made plans to organize a motor truck division. The officers are the same as those of the main association, except that H. H. Rice becomes the new treasurer.

Chattanooga, Tenn., has installed a motor ambulance.

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Fig. 1.

GAYLOR-ATLAS TIRE GRIPS.

Compact enough to be carried in the tool box, made to fit any and every type of wheel, single or dual, and attachable or detachable in less than five minutes for all four wheels, the Gaylor-Atlas "quick attachable" grips for solid rubber tires have solved the last problem in power wagon practice—that of obtaining wheel traction on roads covered with snow, ice, deep mud or sand. The steel shoes are made of various standard sizes set on an angle; therefore a moderate variation in the rim makes no difference. The grips are so constructed that when they are drawn tight the shoes are caused to hug the rim on both sides of the wheel, and as the only fastening is on the outside, there are no loose parts on the inside of the wheel to interfere or catch in the driving chain.

One of the great advantages of the Gaylor-Atlas grips is the quickness with which they can be attached and detached. No tools are required but the hands, and not more than one minute is necessary to secure the grips to the wheel, and they may be detached in less time. This enables the operator to run his car with grips only when necessary, and thus save all needless wear, besides the advantage of always having them with him ready for use, should they be required.

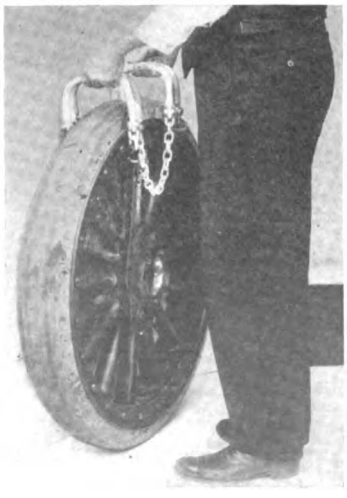

Fig. 2.

These grips are not intended for winter use alone; they are needed at all times of the year. Even under ordinary conditions when no grips are required for running on hard roads, a driver may be required to run his machine in places where he may encounter soft dirt, sand,

Fig. 3.

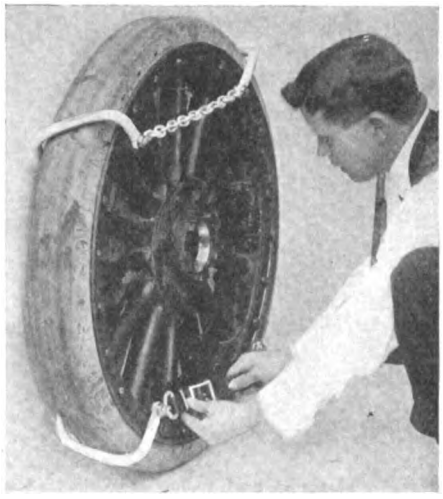

Fig. 4.

mud, oil or wet clay, and the worth of a set of grips at such times will be obvious.

The Gaylor-Atlas grips are made with four gripping shoes only, for the reason that as the shoes lie diagonally across the face of the tire they give a driving efficiency equal to six or possibly eight shoes which lie straight across. Also, as there are no circular side chains on each side of the wheel, and no double fastenings, the makers are able to furnish effective grips which are remarkably neat and compact, considering the heavy work they are required to do.

The manufacturers supply the following instructions for using the Gaylor-Atlas tire grips:

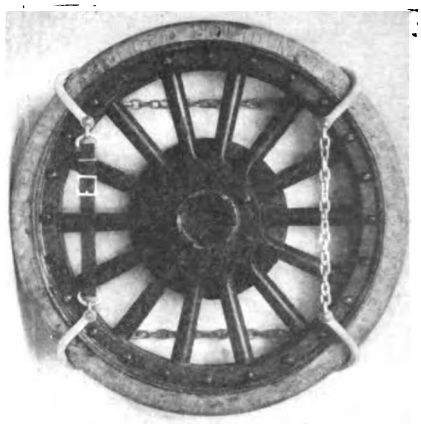

Fig. 5.

"First take the shoe which has the strap attached, in the left hand, holding the strap end towards you as shown in Fig. 1. Then place the next shoe alongside of it as shown in the illustration. Take particular notice that the chain is not twisted and that the shackle connections hang straight and free. After getting the four shoes side by side, place them on the wheel as shown in Fig. 2. Then holding two of the shoes with each hand, spread them apart until the middle chain is tight as shown in Fig. 3. Press the shoes firmly as far as they will go, and then spread the last two shoes around toward the lower part of the wheel until their chains are also tight; then, pressing these shoes as far as they will go, engage the strap in the buckle and pull it just enough to take up the slack, as shown in Fig. 4. Now glance at the chains and their connections and see that they are not twisted or kinked. If they are all right, press each shoe a little in the direction it should go to see that the shoes are not caught on anything, and then pull the strap up tight and secure

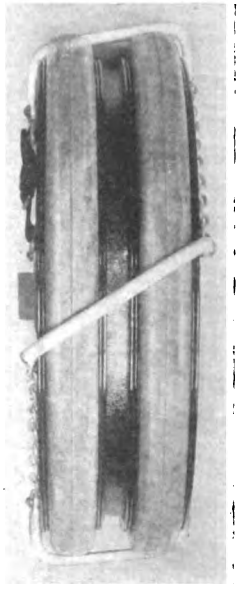

Fig. 6.

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it fast as shown in Fig. 5. The dual tire application is shown in Fig. 6.

"The grips should be kept tight at all times, and it is well to pull the strap up another hole after they have been run a few miles; they will then not require any more attention for the day."

It may be mentioned that the shoes of these grips are made of chrome vanadium steel; that the chain is of Norway iron; that all steel is given heat treatment with pyrometer regulator in the factory; and that all chains and shoes are separately tested on a testing machine for strength before leaving the factory.

The Gaylor-Atlas tire grips are made by the Atlas Chain Company, Brooklyn, N. Y.

HESS-BRIGHT DATA SHEETS.

The Hess-Bright Manufacturing Company, Philadelphia, Pa., is distributing a number of data sheets relating to ball bearings and their use on motor wagons. All manufacturers who have not received the latest set of these sheets should communicate at once with the Hess-Bright Company.

A NOTABLE FEAT.

To inaugurate the 1912 motor wagon season, the Velie Chicago Branch sent a 3-ton Velie truck 124 miles to Milwaukee, carrying a 1912 speedster as a load, leaving Chicago Sunday, January 14, staying over night at Racine, and arriving at Milwaukee 10:00 a. m., January 15.

This is supposed to be the first century run of the season for any motor wagon. The run was made for the purpose of demonstrating the efficiency of the Velie 3-ton truck on the country roads, especially during the winter months. An average running time of 10.2 miles per hour was made for the entire distance of 124 miles, the gasoline consumption averaging 4.1 miles per gallon.

This was a very remarkable record when one considers that the engine speed is governed allowing but 12 miles per hour on account of the low gear ratio of 12 to 1 during the entire trip. With the exception of the time spent over night at Racine, the motor was in continual operation.

White dump truck.

In zero weather every conceivable type of road was encountered on this run. Over steep hills, through deep snow banks, especially at Kenosha and Racine, the Velie truck overcame all road difficulties.

NEW LINCOLN AGENCY.

C. L. Fultz of Lancaster, Ohio, has taken on a line of light delivery wagons manufactured by the Lincoln Motor Car Works of Chicago, Ill. Mr. Fultz will distribute Lincoln delivery cars in Fairfield and Pickaway counties.

WHITE DUMP TRUCK.

The 4-ton White motor truck with dumping body, recently purchased by the Western Fuel Company, has clearly demonstrated the advantage of motor truck delivery over horse driven vehicles.

During the recent cold spell this White truck was worked day and night and has proven itself a valuable innovation in coal delivery work. Not only was the delivery cost per ton considerably lowered, but the speed at which rush orders could be delivered was appreciated by those who needed coal in a hurry.

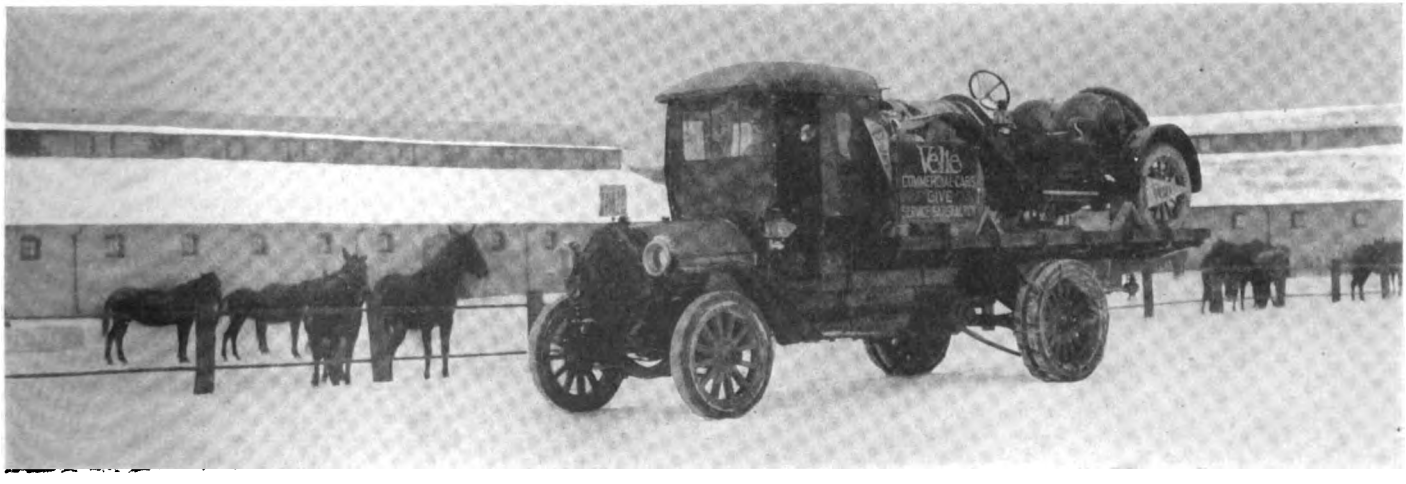
Many of the coal concerns hesitated in adopting motor trucks, on account of the congested traffic in the Chicago loop district and alleys throughout the city. It remained for the Western Fuel Company to solve the problem, and the fact that this concern immediately ordered more White motor wagons effectively proves that the trial machine at least "made good."

G. V. FORGING AHEAD.

The General Vehicle Company reports that in the 30 days ending January 12, there were booked orders for no less than 73 G. V. electrics, nearly 50 of which were 5-ton trucks.

These orders, coming on top of the order for 25 2-ton trucks which were recently delivered to the American Express Company and a fleet of 12 for the Bureau of Yards and Docks, will start the new year with a rush in the General Vehicle Company's plant at Long Island City. The General Vehicle Company will shortly make public a statement showing that 60 per cent of its total 1911 business was reorders.

Col. Jacob Ruppert, who heads the brewers' list as an electric truck enthusiast, will soon have more than 70 G. V. electrics in his regular delivery service. Peter Doelger more than 50 and George Ehret 61. Colonel Ruppert's installation is the largest of its kind in the world.



A study in contrasts—a 3-ton Velie truck carrying a 1912 Velie speedster, en route from Chicago to Milwaukee. Yes, it got there all right.

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Holds the world's non-stop record of 336 hours.

ALCO BEATS NON-STOP RECORD.

The world's non-stop record for a motor wagon in continuous service has again been beaten by an Alco (American Locomotive Company) 3½-ton power wagon, which, at 5 a. m. on January 20 last, completed 336 hours of day and night service without having its motor stopped at any time during the 14 days of continuous running.

The machine was employed in the regular service of the United States Express Company, being used during the day for house to house deliveries in a number of New Jersey cities, and during the night for transferring heavy loads between the express company's headquarters in Hoboken and the Central Railroad of New Jersey in Communipaw.

In this service the Alco motor wagon replaced five 2-horse teams, and four men were required with the machine service as against ten who would have had to be used with the horse wagons.

Had this feat been accomplished in ideal weather it would have been considered noteworthy, but as the climatic conditions were exceptionally severe the performance was simply superb—surpassing even the most optimistic expectations—for the machine adhered strictly to schedule throughout the entire test. Snow, ice, rain, wind, streets as slippery as glass, grades unsurmountable by horses—these were some of the obstacles that had to be overcome, and not once was the machine unable to come through successfully under its own power.

The log of the run showed that the Alco transported an average of 31,510 pounds of merchandise a day, averaging 66 miles, 14 trips, and 92 stops for collecting and distributing its cargo.

The record for miles in a single day was 86, and the largest number of trips was 22. The high mark in stops—104—was made on the first day of the run, and on Jan. 17 the machine hauled its heaviest day's loads, totaling 43,978 pounds.

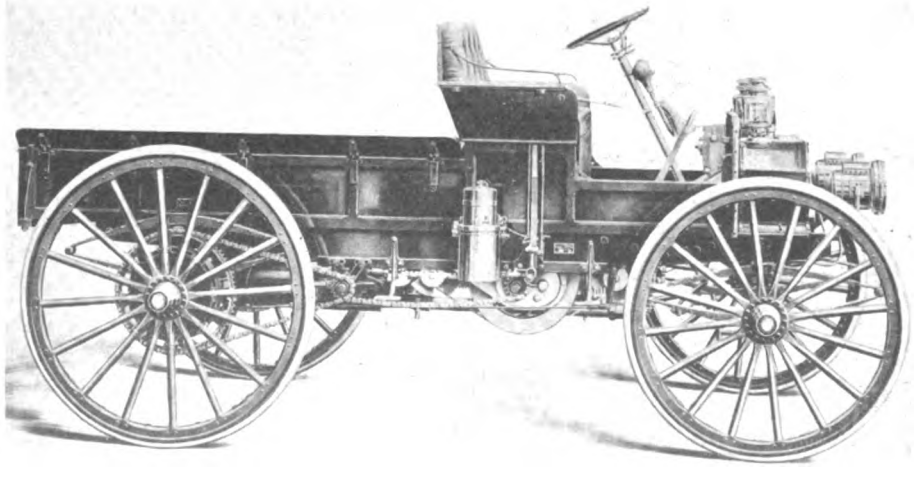
An average of one gallon of gasoline to an hour of service was maintained.

The total number of miles covered during the two weeks of duty was 922. All told, 198 trips and 1,284 stops were made. The entire number of pounds hauled throughout was 441,136.

When the run terminated an examination of the mechanism was made for the first time, and it was said that the truck showed no effects of the strenuous test it had been through.

A significant event was the purchase of 10 Alco motor wagons by the Long Island Express Company several days before the end of the run. This company bought its first 10 Alcos one year ago immediately following the setting of the first non-stop record.

The record which this truck surpassed was made by an Alco a year ago, when a 3½-ton truck ran on the streets of New York for six days and nights, following this performance with a trip overland to Philadelphia—a total of 168 hours. A month ago another Alco was required to serve the Adams Express Company for 144 hours without interruption.



The International motor wagon.

I. H. C. MOTOR WAGON.

With the aid of years of experience in the design of machinery that has successfully withstood the hardest kind of use and abuse that man-made products were ever subjected to (we refer to harvesting machinery, farm tractors and the like), with a practically unlimited capital, and with a reputation to uphold that is second to that of no other engineering concern, the International Harvester Company has evolved a 1,000-pound motor wagon that was originally conceived as a country proposition, but which has

I. H. C. motor wagon.

achieved such a reputation in urban communities that no less than 250 of them are already in operation in the city of Chicago alone.

Although a comparatively late arrival in the motor wagon field, the International Commercial Car—as this machine is called—has already been sold to the number of over 3,000, and the company is preparing to make and sell at least as many more this year. After which it is not necessary to add any encomiums as to the commercial worth of this practical little machine.

In many ways the design of the International motor wagon is unusual, but one is quickly impressed with the fact that here is a motor wagon that was designed for a specific purpose—to go anywhere and do anything within the capacity of a machine of this type—and that no touring car or horse wagon traditions enter into its make-up. The tremendous and increasing sales of the machine, and the reputation of the manufacturer, however, preclude all possibility of the idea that the International Commercial Car is a freak or anything

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but a practical solution of the up-to-date merchant's quick, light delivery problem.

The International is a big-wheeled, solid-tired motor wagon, made to travel over the worst roads and the steepest hills. A "foolproof" 2-cylinder, 4-cycle motor furnishes ample power to do this with the car loaded to capacity. The oiling is positive through a force feed mechanical oiler.

The transmission is a device of special merit. There are three speeds—two forward and one reverse. On high speed, the drive is direct from the motor. This transmission is equipped with a device that eliminates the danger of the driver placing two sets of gears in mesh at the same time. The clutch is of the band type. It can be adjusted with absolute precision and is very convenient to reach whenever necessary.

The drive is by chains from the jackshaft to the two rear wheels—noiseless roller chains being used. The chain-drive is claimed by the company to transmit more power with less weight than any other form of drive.

The regular body is of a panel type. It is 67 inches long, 35 inches wide, and 9 inches deep—not including the flare boards, which may be removed when not needed. The box ironing and bracing is all on the outside, leaving the inside of the box perfectly smooth. An extension sill and brace makes a very strong construction at the rear of the box.

Efficient brakes are a necessity. The International Commercial Car is equipped with brakes that make the control positive—an external band on the jackshaft and an internal expansion brake in both rear wheels.

I. M. CO. FACTORIES.

The physical equipment of the properties of the International Motor Company is thoroughly modern. The buildings and machinery of the Allentown shops have practically been installed since 1905; and the greater portion of the machine tool equipment has been put in within the past three years.

The Allentown shops occupy a site of 22 acres, very favorably located with reference to shipping facilities on the Central Railroad of New Jersey and the Lehigh Valley Railway. The manufacturing is now being conducted in nine separate brick buildings of the most approved mill-type construction. The main buildings, such as the machine shops, assembly and painting departments, have saw-tooth roofs with Luxfer prism glass, and the ventilation and lighting are in accordance with the latest practice in industrial plant architecture.

The offices of the Allentown shops are located in a separate two-story "Administration Building," the general architecture of which is in harmony with the other buildings.

The Mack factory of the International Motor Company.

At the present time the shop force of the Allentown properties numbers 640 men; and the capacity of the plant with this force averages 90 complete Mack trucks per month. Mack trucks are at present being offered in sizes from 1 to 10 tons' capacity. During the month of December, 1911, 165 power wagons were turned out of the Allentown Works alone.

The factory buildings and machinery of the Saurer Motor Company are practically new, and the large additions to the original buildings have just been completed and the new machine and tool equipment only recently installed. The manufacture of Saurer power wagons and the assembling of parts is now under way.

The buildings of the Saurer properties of the International Motor Company occupy a site of five acres adjoining the Clinton avenue station of the Central Railroad of New Jersey, and are parallel to their tracks. The buildings are five in number and of modern mill-type design, well lighted and ventilated. The main machine shop (as are the other buildings) is constructed of brick, steel reinforced, and of one story, occupying a space of 100 by 520 feet. The main machine shop contains a bay of approximately 80 by 200 feet. Two smaller shops for the manufacture of small parts and a modern power plant complete the productive buildings of the properties.

The offices of the Saurer shops are housed in a two-story "Administration Building."

NEW LIPPARD-STEWART AGENCY.

The Sterling Place Garage and Sales Company, 788-796 Sterling Place, Brooklyn, has just been appointed a dealer for the Lippard-Stewart motor wagons. This is a new line of delivery cars which has recently been placed upon the market. The Lippard-Stewart cars are manufactured in Buffalo and are designed by R. G. Stewart, formerly of the Franklin Automobile Company of Syracuse.

The Sterling Place Garage & Sales Company has one of the largest garages in the city of Brooklyn, containing 22,000 square feet of space. It has the Long Island territory for the Lippard-Stewart Company.

M'KEOUGH JOINS VELIE.

J. W. McKeough, who has been interested in the power wagon industry for the past year or two, has accepted a position with the Velie Chicago branch in the motor truck department. Mr. McKeough is very enthusiastic over the Velie line of motor wagons.

The Saurer factory of the International Motor Company.

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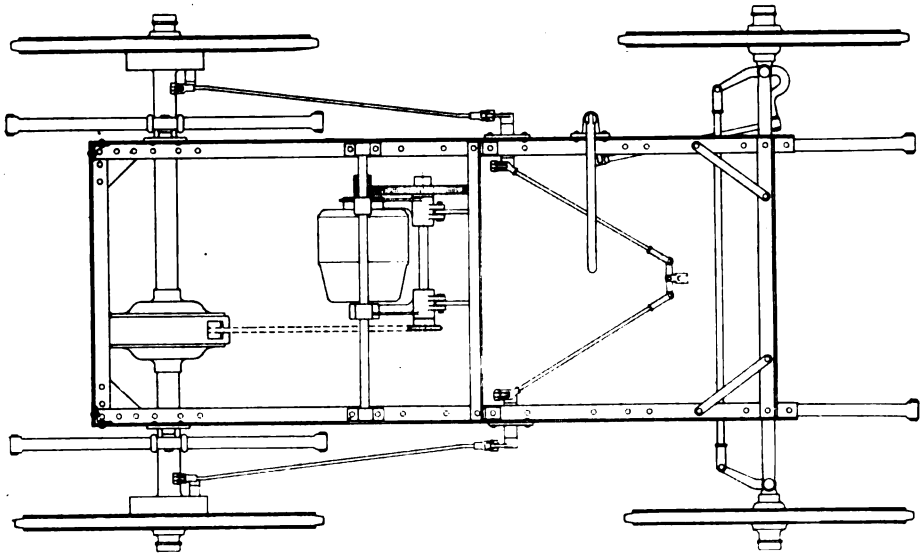

Plan of chassis of 500-pound Joliet electric wagon.

FIRESTONE AT THE SHOWS.

Among the many features of more than usual interest to visitors at the big auto shows this season will be found the non-skid tire and quick-detachable demountable rim of The Firestone Tire & Rubber Co.

The former has a unique heavy raised lettered tread of tough rubber making it nearly double the thickness of an ordinary smooth tread casing. The peculiar arrangement of this lettering presents countless sharp edges and angles to the road and the hollows of the letters create vacuums against the paving, combining two well known principles of skid preventing. This tire, as are all other Firestones with the exception of the regular clincher pattern, is furnished with a floating flap.

The Firestone quick-detachable demountable rim possesses many points of interest. Aside from the fact that it requires but the loosening and tightening again of a few nuts to change a punctured tire for a spare one already inflated, its quick-detachable feature is of greatest importance, it being possible to change tires with the rim on or off the wheel as the operator may choose. No rim tools are used. An ordinary wrench will do to demount the rim, and a common screwdriver to detach a tire.

A complete line of pneumatic tires, including Firestone quick-detachable clincher, straight-side and regular clincher with a full line of repair stocks, will be shown.

The Firestone cushion electric tire, while not an entirely new invention, will be exhibited at the shows for the first time. It is a development of the Firestone special electric tire with which electric vehicle owners are familiar. The newer tire has been improved in its riding qualities by giving it a double or dual tread, and adding internal cavities at frequent intervals in the base directly under the tread.

500-pound electric wagon made by the Joliet Auto Truck Company.

JOLIET ELECTRICS.

Those who have been driven to purchase light delivery gasoline motor wagons because the price of the electrics of similar rating was too high can no longer offer this as an objection against the latter type of machine, for an electric wagon of 500 pounds' capacity has recently been placed on the market to sell for $850. The mileage capacity is from 30 to 35 miles on a single charge of the batteries, but as an extra battery can be supplied for $100—for replacing the other at noon—a daily run of 60 miles can be obtained for an outlay of less than $1,000 for the machine and this extra equipment.

The Joliet Auto Truck Company, of Joliet, Ill., is the new concern which has had the temerity to produce the inexpensive model to tempt the pocket books of those who might hesitate at a higher priced machine. And yet the new electric wagon is no "heap of junk," as might be imagined—from the price. The makers would not have the nerve to offer a five-year guarantee with the machine if that were the case, nor would the controller and the motor bear the Westinghouse label. And as for the battery, of course no one could expect more than the ordinary lead type for the money, but for an extra $150—or $1,000 in all—the Joliet 500 pound model is furnished with the latest Edison battery, which is guaranteed by its makers for four years—and is good for much longer than that, as a rule.

No cast iron is used in the construction of the other parts of the machine, steel and malleable iron being specified in the chassis throughout. The frame is of steel. The springs are generous in size, three-fourths elliptic in front and full elliptic in the rear. The wheels are of large diameter, 34 inches front and 36 inches rear. Ball and roller bearings are used throughout. The wheelbase is 70 inches, and the speed from 10 to 13 miles an hour. Altogether, the machine is a remarkable product, and one wonders that it can be made to sell at the figure.

The Joliet Auto Truck Company also builds 1,000 and 2,000-pound capacity electric wagons to order. Each is capable of carrying an overload of 500 pounds.

NEW MOTOR WAGON TIRE.

The Diagonal Block Tire Company, of Urbana, Ohio, is marketing a new heavy duty truck tire recently invented and patented by Albert L. Siegrist, of Akron, Ohio. This tire has several good points, including removability of any block without interfering with the others, smoothness of traction afforded, increased grip on the road surface, and ample surface for heat radiation.

Diagonal block tire.

The removal feature is made possible by the use of two "U"-shaped head bolts running downward through the felloe, and a bolt crosswise through the downward flange. When all bolts are in place they become a solid mass eliminating the strain from any one particular block.

Each diagonal section or shoe has a down-turned flange with an upturned hook

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projecting in opposite direction. The bottom part of this hook is filled with hard rubber secured permanently into the shoe. The downward portion of the flange fitting over the felloe prevents the shoes from slipping sideways.

The blocks are placed on the wheel diagonally. This diagonal feature gives a smooth continuous roll and also prevents skidding and allows for rubber displacement.

VERY PRACTICAL DUMP TRUCK.

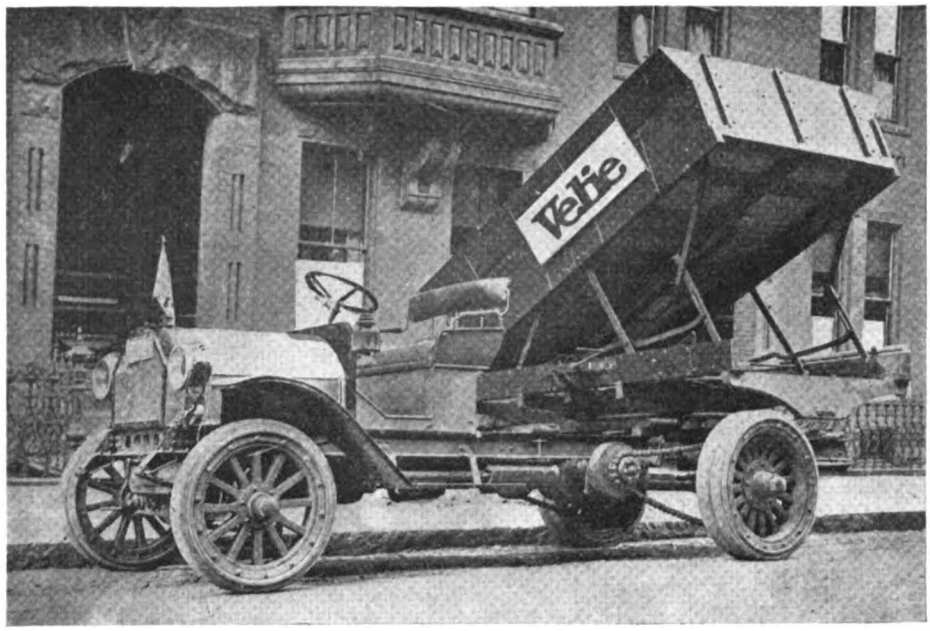
Coal dealers, contractors, in fact every business man who needs a dumping body for a commercial truck, will be interested in the new Velie revolving coal dumping body which is being demonstrated by the Velie Boston Branch. It has created the greatest interest among the business men of Greater Boston as it is an invention long sought and much desired.

The Velie coal dumping body may be elevated to any angle desired and is then swung around on its roller bearing turn-table so that the load may be dumped or shot in any direction desired. The Velie coal dumping body will dump three tons through a chute across a 20-foot sidewalk in three minutes. Not only does this body facilitate the unloading of coal, sand or brick, but it also eliminates all wear and breakage caused by backing a heavily laden truck into the curb; there is a saving on tires and on every part of the chassis as there is no need of backing for the driver to get his load into proper position for dumping.

The feature of this truck which appeals to the coal dealer is the fact that it does not obstruct traffic in the least as it is parallel with the sidewalk and does not extend unduly into the street.

The Velie Boston Branch is receiving many orders for this body on the standard Velie truck from dealers throughout New England and requests for demonstrations are being received in every mail.

The Velie trucks are delivered with the regular Velie bond guarantee of service and satisfaction which means continuous service of a truck at all times with the greatest economy.



Velie dump truck with revolving and tilting body.

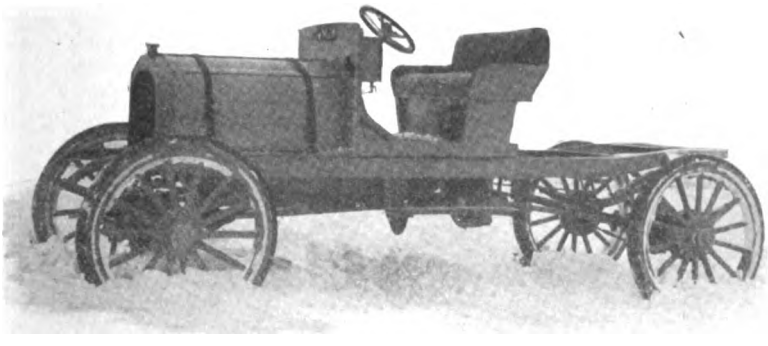
4-WHEEL DRIVE ARMY TRUCK.

The Quartermaster's Department of the U. S. Army recently requested a four-wheel drive motor wagon from the Four-Wheel Drive Auto Co., Clintonville, Wis., to participate in army maneuvers during the latter part of January.

"This truck," says W. A. Allen, president of the company, "is a remodeled touring car chassis, inasmuch as the order was given on too short notice to build a motor wagon of this type. It has power on all four wheels; shaft-drive to both front and rear axles, both being of the bevel gear, full floating type; front axle four-wheel drive patent with ball and socket steering joint, inclosing, oil and dust-proof, the universal driving joint, enabling car to drive and steer on front axle at the same time.

"Power is furnished by a 45-horsepower four-cylinder motor. There is a multiple disk clutch, with sliding gear transmission, back of which is placed a sub-transmission consisting of a Morse silent link chain and gears. Inside the driven gear is placed a differential to differentiate between the front and rear axles in turning corners, and from this two shafts drive to bevel gear differentials on both axles. Next to the sub-transmission on these shafts are placed our patented locking devices, one on each shaft, which are an emergency proposition for running on opposite pair of wheels in case of serious damage to either shaft or axle.

"A representative of the War Department came to our factory at Clintonville, Wis., a few days ago for the sole purpose of trying out our car, which he did to his entire satisfaction. After trying out the machine an entire day in all sorts of road conditions, through mud holes, sand dunes, steep, slippery grades, through soft plowed and unplowed fields, he expressed his belief that our four-wheel drive would solve the problem of transportation of army supplies for the government, owing to its wonderful power and simplicity."



Four Wheel Drive automobile ordered for U. S. Army motor wagon demonstration.

GOOD FOR SWINEHART.

One of the largest and most exacting users of motor trucks in New York is the American Express Co. It maintains a garage famous throughout the country for its completeness, and maintains carefully kept records and data on truck and tire service.

This company, it is announced, is now equipping nearly all its motor wagons with Swinehart tires, and has specified Swineharts on the following newly ordered machines: Forty 2-ton Baker electrics, five 3-ton Studebaker electrics, fifty 2-ton General Vehicle electrics, five 3-ton Peerless and five 3-ton Alco gasoline trucks.

CHASE APPOINTMENT.

Charles E. Reynolds of Syracuse, N. Y., one of the best known old time bicycle salesmen, has recently been made a district manager for the Chase Motor Truck Company. His territory covers Chicago, and certain portions of the middle west. He has established his headquarters in the Marquette Building, Chicago, Ill.

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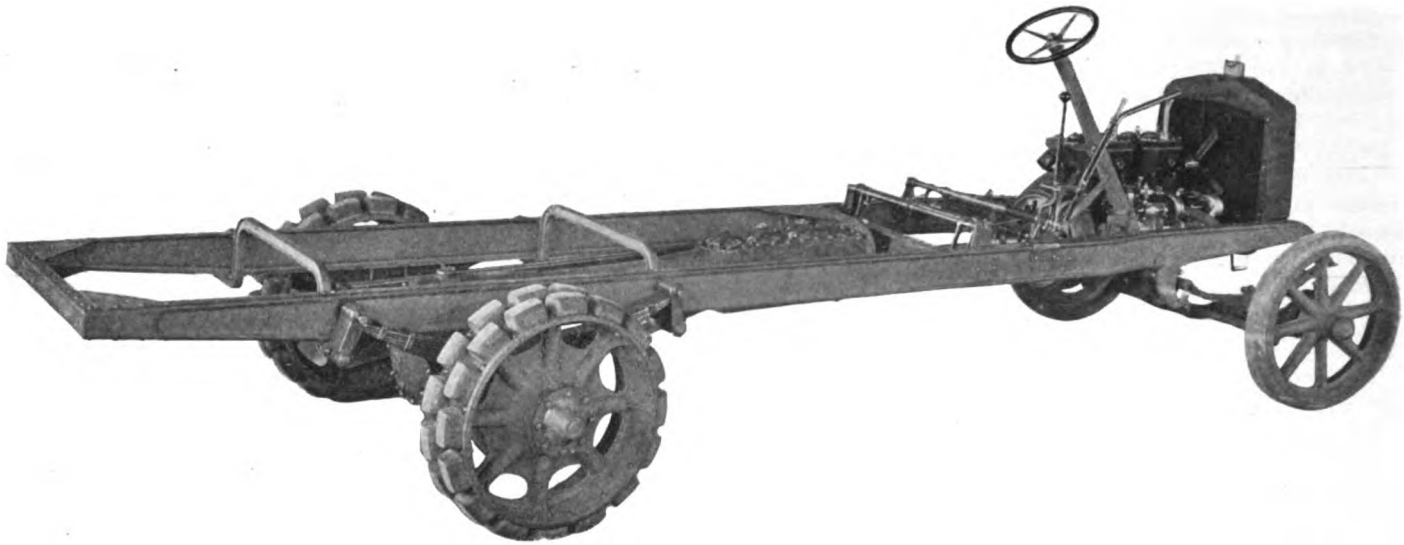


Chassis of "Smith-Milwaukee" 3-ton power wagon.

NEW 3 TON MODEL.

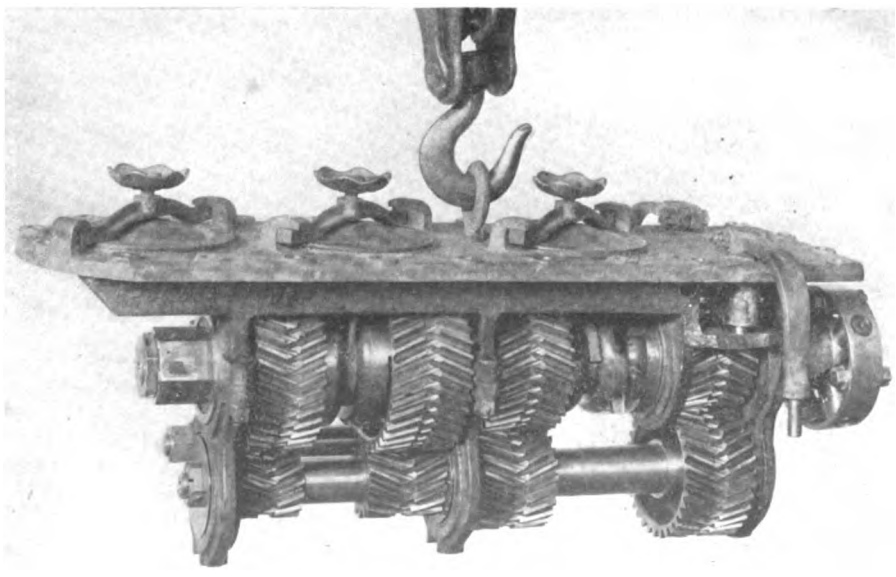
"Smith-Milwaukee" Heavy Duty Motor Wagon is a Credit to the Industry.

With the accumulated experience of over ten years' successful practice in the design and manufacture of automobile parts, a personnel of engineering talent that may be equalled but is not excelled in this or any other country, factory accommodations occupying 45 acres of land and over 12 acres of floor space, and a million-dollar surplus to back up in a business and practical way the convictions of its managers and engineers, the A. O. Smith Company of Milwaukee, Wis., has at last completed its plans and factory arrangements for the production of heavy duty motor wagons, which embody the most up-to-date, tried and proved principles of engineering design and the finest materials of construction that money can buy.

These machines have three outstanding features that command one's attention at the outset:

1. The unit assembly plan on which the chassis is designed.
2. The herringbone gear transmission.
3. The worm drive rear axle.

Each of the more important units—all of which are made so as to be interchangeable from one machine to another—has been constructed so as to be easily removable without disturbing the other parts. Thus, the engine is mounted on a subframe which also carries the radiator, and the entire power plant may be removed by taking out four bolts. The radiator, being attached by four screws, may be independently removed. The steering gear is secured by three bolts, and is readily disassembled, and the screw of the steering gear may be independently removed by taking off one nut and withdrawing through the tube. The cone clutch may be taken off without disturbing the foot pedal shaft or transmission. The transmission may be taken out without removing even its case, much less disturbing any of the other units, and the entire rear axle differential and worm gear assembly with all its bearings is removable from the rear of the axle housing.



"Smith-Milwaukee" transmission.

To the motor wagon expert these facts alone would be sufficient proof that the "Smith-Milwaukee" power wagons have been evolved from the basic principles of sound engineering and correct operating practice which are essential to the complete success of a motor vehicle for road transport of heavy loads. But there are other features worthy of mention.

The transmission—which in most power wagons usually furnishes one of the heaviest items in the repair account—is one of the most commendable features of the "Smith-Milwaukee" machines. The illustration shows better than mere words can tell the reason why this part of equipment is unexcelled in motor wagon design, and it is unnecessary to add that the engineers of the A. O. Smith Company especially pride themselves on the result of this part of their labors. The gears of this transmission are of the herringbone or double spiral type and have a 3-inch face which absolutely precludes all possibility of stripping, this being further insured by the fact that they are always in mesh. The shafts of the transmission are each supported by a third bearing in the center which makes it impossible for them to spring out of line. The elimination of repair charges on the transmission—which is assured by this type of construction—is an important factor in keeping down the operating costs of the "Smith-Milwaukee" motor wagons to the lowest possible amount, besides materially reducing the depreciation or amortization part of the account.

The rear axle of the Smith-Milwaukee truck is of the full floating shaft type with worm gear drive which provides in a single member the necessary reduction between the engine and the rear wheels. This simplifies the machine by the reduction of parts and the elimination of any members that cannot be entirely inclosed and run in oil.

Coming now to the details of the design, the engine is a 36 hp., 4-cylinder Continen-

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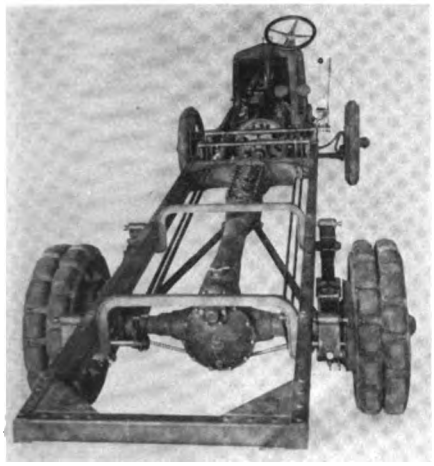
tal motor, 4½-inch bore by 5½-inch stroke, with cylinders cast in pairs and valves all on one side. Ignition is effected by a Bosch magneto and an independent auxiliary battery system, equipped with a four-coil and master vibrator unit and independent set of spark plugs. The radiator is a specially designed vertical copper tube type, with cast aluminum reservoir top and bottom. The cast steel wheels have integral hubs and brake drums and are made according to the new A. L. A. M. standards. They are lighter and stronger than wood wheels, and practically indestructible. Wood wheels, however, may be furnished at customer's option. The driver's seat, hood, under bonnet, fenders, etc., are all made of pressed steel. The frame—as befitting the reputation of the A. O. Smith Company in this feature of motor vehicle design—is exceptionally well made. It comprises the highest type of pressed steel construction, having a special beaded section channel which is very strong and flexible and free from crystallization under severe duty. The



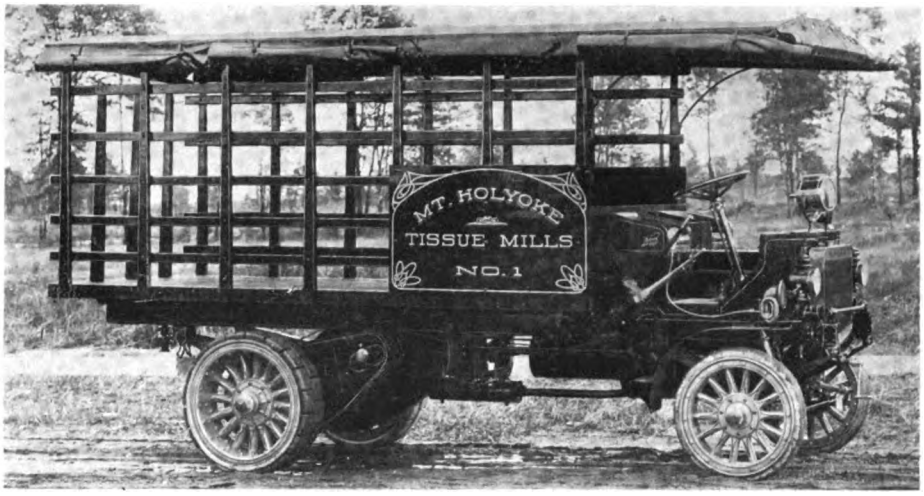
"Smith-Milwaukee" chassis.

channel is 7 inches deep and 21 feet long, the normal loading area being 12 feet by 6 feet. The brakes are of the internal expansion type and are applied directly to the rear wheels. They are provided with a powerful cam control and are independently adjustable by four large wing nuts placed at the rear of the brake drums. Pull rods running forward from the brakes are of a light channel section, pressed steel, which prevents vibration and consequent noise. The speed is governor controlled to 12 miles an hour.

Further details of design are fully given in the specification tables in this issue.

The A. O. Smith Company guarantees its motor wagons—except special parts purchased from and warranted by independent manufacturers—for a period of one year.

Maintenance (including all repairs) for two electric fire motors in a German city worked out to $51.90, $147.81, $106.38 and $163.47, respectively, in four successive years.



Knox Automobile Company's new 6-ton model.

KNOX ADDS 6-TON MODEL.

For the coming season the commercial line of the Knox Automobile Company of Springfield, Mass.—a concern which has been manufacturing motor wagons since 1901—has been augmented by the addition of a 6-ton model. It is of the regular Knox type with driver's (removable) seat beside the engine and is of very sturdy construction throughout. Some of the special features are a 5-inch round rear axle; 42-inch dual rear tires; 50-horsepower motor; extra heavy transmission; and a gasoline capacity of 45 gallons. The experimental model was out on the road last March. Since its perfection at least a dozen have been placed in commercial service and are giving excellent results.

The Knox "Martin" tractor is another new model placed on the market this year. It is a single-wheeled device designated to be attached to any horse-drawn apparatus and takes the place of the horses.

Besides these two new models the Knox company will continue to build 2, 3, 4 and 5-ton motor wagons, with designs for every line of business. However, the size of the axles and tires has been increased on every model. Hereafter, too, all motors and radiators will be suspended on springs to relieve the mechanism of road shocks.

MOTOR WATER CARRIER.

Supplying water to traction engines is the novel use to which a motor wagon is being put in the service of the Rock Creek Conservation Company in Wyoming. This machine, which was supplied by the Grabowsky Power Wagon Company, is operated continuously night and day, and covers an area of 12 by 6 miles—72 square miles—over country which comprises bad roads, unbroken prairie, sage brush, and rock strewn stretches of laval formation.

Mounted on the rear end of the machine is a 2-horsepower engine and rotary pump for the dual purpose of filling the tank from ponds or irrigation ditches, as well as discharging into the water tanks on the moving traction engines, the idea being to prevent loss of time by filling the tanks while the engines are in motion.

Operating continuously night and day, this machine covers an area of 72 square miles supplying water to tractors.

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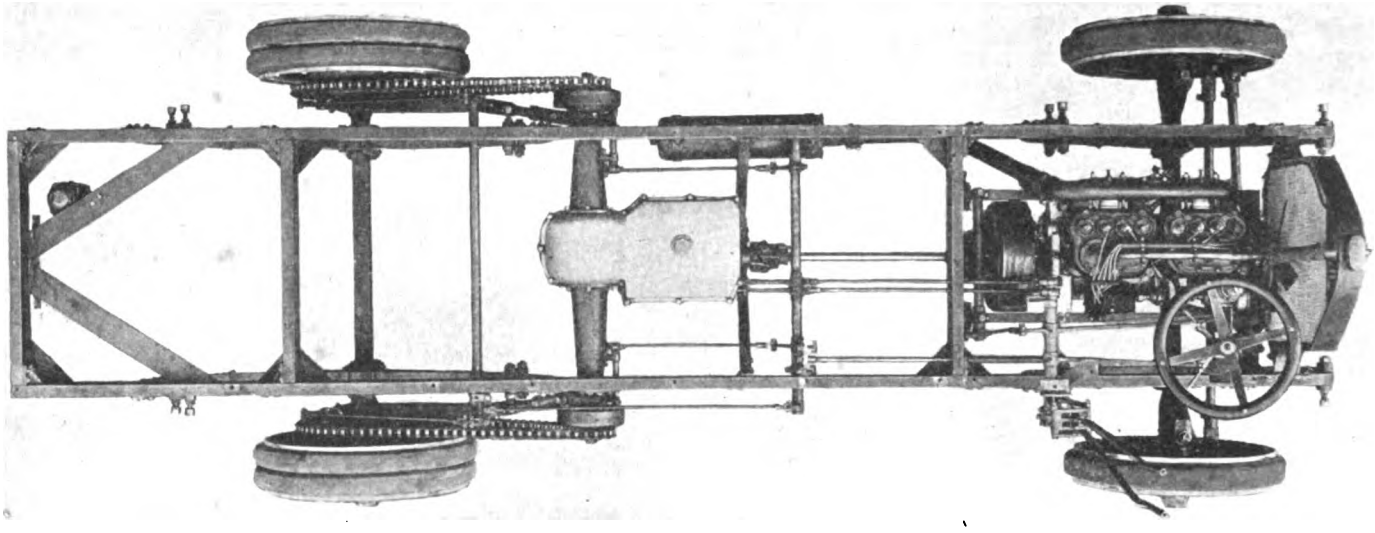


Plan of chassis of Universal Machine Company's motor wagon.

"PROGRESS" MOTOR WAGONS.

Strength, durability, simplicity and accessibility of all vital parts were the aim of the engineers who designed the 1½ and 3-ton "Progress" power wagons which are manufactured by the Universal Machinery Company, of Milwaukee, Wis. These machines are made practically in their entirety at the factory, so that the company may be assured that only the best of material and workmanship enters into their composition.

Both of these machines are designed on the same general lines and in accordance with the latest and accepted practice in power wagon construction. The following description applies to the 3-ton motor wagon:

The motor, which has a 4½-inch bore and 5½-inch stroke, is protected from road shocks by being carried on a spring suspended subframe. The radiator, of honey-comb design, is also carried on springs. The valves and other moving parts of the motor are inclosed. Splash lubrication is employed, and cooling is effected by means of a centrifugal circulating pump and a pressed steel fan. A Mea magneto furnishes the current for ignition.

Increased loading area is obtained by placing the motor under the seat, and suitable traction is afforded by carrying 60 per cent of the load over the rear wheels, this being accomplished by having a rear overhang of 50 inches. Chassis strength is insured by the use of a 6 by 2-inch structural channel steel frame.

A leather-faced cone clutch of special design is used on this model, and long life of the transmission is assured by the use of wide-faced nickel steel gears and imported ball bearings. The Raybestos covered 2 by 10-inch service brakes, bolted directly to the sprocket wheels, provide ample braking power for ordinary use, while the 3 by 18-inch asbestos-covered emergency brake gives all the extra stopping power that could be desired in case of necessity.

The wheels are of the conventional artillery type, 36 by 5 inches in front and 36 by 4 inches dual in the rear, and are carried by Timken roller bearings on heavy forged axles. The wheelbase is 132 inches and the tread 68 inches. The springs are semi-elliptic and of ample size, 3 by 42 inches front and 3 by 52 inches rear. These are held by ⅞-inch hardened steel pins which, like all movable joints, are provided with grease cups.

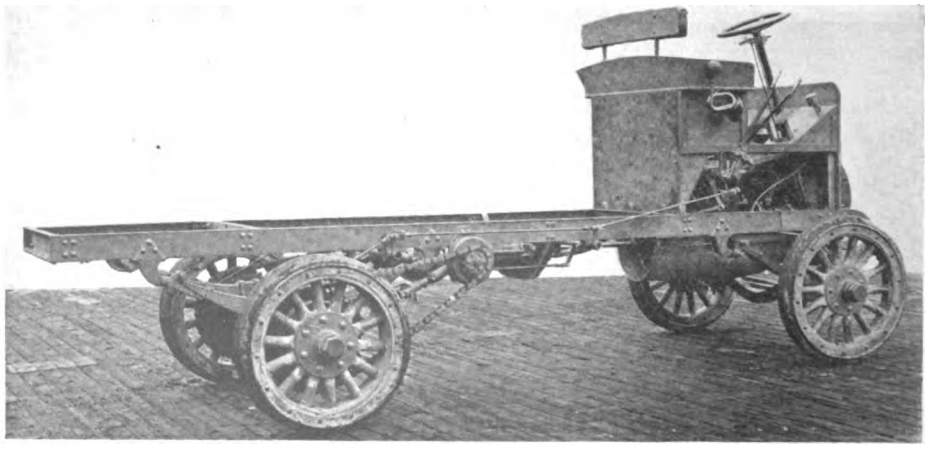
As showing the convenience and accessibility of the "Progress" motor wagons it may be mentioned that the pedal and hand-lever shafts are all placed well back of the motor, thus leaving fine access to the magneto, carburetor, etc., while the driver's cab can be removed simply by taking out a few bolts without disturbing any other parts of the machine, thus exposing the entire power plant for inspection or adjustment. These motor wagons also are as near "foolproof" as it is possible to make them. Even the speed cannot be increased beyond a safe limit, this being assured by the use of a flyball governor which is connected to the carburetor by a concealed shaft.

SERVICE CHICAGO AGENCY.

Announcement is made by the Service Motor Car Sales Company, 3738 Cottage Grove avenue, that it has accepted the Chicago agency for Service motor trucks. These machines are manufactured in Wabash, Ind. The Service Motor Car Sales Company will push the sale of the Service 1,000-pound delivery wagon. This device is particularly adapted to the needs of merchants who have light haulage problems. The motor is of the four-cylinder type and is of twenty-four horsepower. The machine has a 106-inch wheel base. Friction drive is used. The Service Company also produces a convertible roadster. This machine can be readily changed into a light delivery wagon. J. H. Fitch is manager of the Service Motor Car Sales Company.

DENVER CO. CHANGES NAME.

The MacFarland Auto Company, of Denver, Colo., has shown in a practical way its appreciation of James I. East—associated with the concern for the past two years—by taking that gentleman into the company, changing the name of the corporation to The MacFarland-East Auto Company. The personnel remains as before.



Universal Machinery Company's chassis.

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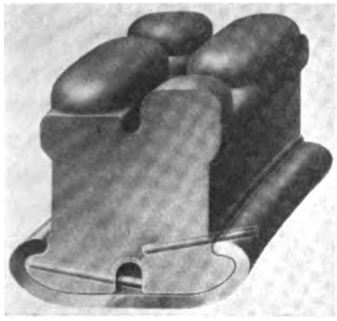
REPUBLIC SHOW EXHIBITS.

The tires described in the following are, have been or will be exhibited by the Republic Rubber Company, Youngstown, Ohio:

The Republic solid electric "staggard tread" tire has been designed for use on electrics and light delivery cars. This tire is copied after the Republic pneumatic "staggard tread," and is designed so as to give a greater resiliency and greater anti-skidding qualities than the other types designed for similar service. Owing to the broken tread, this tire will draw less amperage when used in electric cars than would solid tires, and is so resilient that it compares favorably with pneumatic tires for that service. Republic solid electric "staggard tread" tires are especially suited for use on light motor wagons, owing to their great strength and endurance. The "staggard tread" in service proves to be an effective anti-skid, and the use of chains is unnecessary in connection with this tire, which appeals especially to motor wagon users on account of the lessening of the liability for accidents due to skidding.

The Republic Rubber Company's exhibit for pleasure cars consists of Republic "staggard tread" tires and blackline red inner tubes. For motor wagon practice, the company's solid motor truck tires have been redesigned so as to permit the use of fewer cross wires. This greatly reduces the internal stress of the tires and lessens the liability of the tires to tear out at the base. The fastening is the very well known clincher flange type which makes the tire quick-



Republic solid tire.

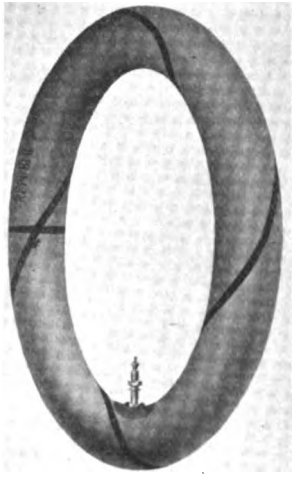
detachable in practice as well as in theory, so that tire renewals can actually be made upon the road, if necessary.

CONCERNS NOT CONNECTED.

According to the Boston "Daily Globe," the Kissel Kar Ko, now in the hands of a receiver, has no connection with the Kissel Kar New England branch.

H. B. Pruden, president of the Kissel Kar New England branch, a Wisconsin corporation licensed to carry on its affairs in the State of Massachusetts, in a recent interview stated that the old Kissel Kar Ko, of which George W. Coleman, formerly bookkeeper of the National Bank of Cambridge, and now serving sentence for assisting in the wrecking of that institution, was connected in an official capacity before his arrest two years ago, has no connection with the new corporation, nor has any of the officials of the old corporation any connection whatsoever with the new corporation in this state.

The Kissel Kar New England Branch, 10 Columbus avenue, Boston, verifies the newspaper story.



Republic inner tube.

BESSEMER MOTOR WAGONS.

The Bessemer 1-ton motor wagon is of the two-unit type. The first unit is the motor and clutch supported on the frame side members with four arms cast integral with the upper half of the crankcase. The second unit is made up of the gear box, jackshaft and differential. This unit is also supported through the frame at three points. Each unit can be removed from the machine without disturbing the other and the whole design is remarkable for its accessibility and simplicity. It is possible to remove or replace the engine or the clutch, transmission or jackshaft in ten minutes.

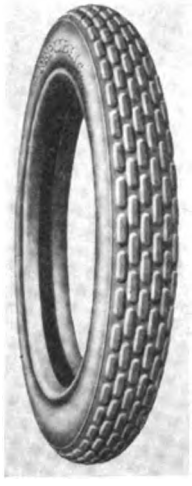
The Bessemer motor wagon has been designed to give as much loading space as possible with limited wheelbase of 107 inches, without sacrificing the good features of accessibility of motor or the comfort of the driver in getting in and out. The car is equipped with a four cylinder motor, Bosch dual system ignition and Schebler carburetor. Lubrication is force feed with a gear pump, and the motor is equipped with a well known gas self-starting device. Cooling is by thermo-siphon with the radiator carried in front supported by springs and protected against damage through the cross member in front of the radiator. The clutch is of the cone, cork insert type. The steering of the car is left hand, with right hand control levers for gear shifting. The transmission is of the selective type—3 speeds forward and 1 reverse—using 15/16-inch face nickel steel gears. Final drive from jackshaft to rear wheel is by double chain. The rear axle measures 1¾ by 2¾ inches, and is provided with nickel steel spindles. Wheels are 34 by 3½ inches in the rear and 34 by 3 inches in the front. Both front and rear wheels have 14 spokes each. The machine has a turning radius of only 33 feet.

REWARDS FOR IDEAS.

The man who puts creative thought into his work is valuable. He works with enthusiasm, with energy, with thoroughness. Great manufacturers appreciate this more and more each year, and are eager to seek out, encourage and reward this constructive element.

On July 18, 1911, the Republic Rubber Co. of Youngstown, Ohio, posted in its works notice of an idea contest for employees, this contest to close Dec. 20. Four cash prizes, aggregating $300, were offered. First and second prizes in Class 1 were awarded on the best suggestions for improvements in existing machines, processes or methods of manufacture in use by the company. In Class 2, first and second prizes were offered for best original plans for new machines, processes or methods of manufacture. These contests were open to any employee of the company except general officers.

Surrounded by a cheering mass of workmen, the Superintendent announced the winners and made the awards on December 21. The interest and enthusiasm manifested by the men was most gratifying, and



Republic "staggard" tread.

the Republic Rubber Co. intends to continue this as an annual event.

PACKARD SERVICE IN BROOKLYN.

The Packard Motor Car Company announces the opening of a salesroom at Flatbush and Eighth avenues, Brooklyn, N. Y. Complete facilities are included for maintaining the liberal standards of Packard service for the rapidly increasing number of Packard owners in Brooklyn.

Webster, Mass., has installed a motor ambulance.

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BOSCH HIGH TENSION PLUGS.

Bosch high tension spark plugs for 1912 are of the same general construction as the highly satisfactory Bosch plugs of former years, but have been made even more efficient and reliable. The accompanying cuts, showing the complete plug and an end view, give a fair idea of the sound and substantial form adopted in the construction of this item.

As before, the Bosch plug consists of but three principal parts: the heavy central electrode, a one-piece insulator and a steel shell.

As shown in the end view, however, the form of the three electrodes is now crescent shape, which gives them a lower electrical resistance and produces a spark in the form of a sheet rather than as a ball. In consequence of this formation a spark will jump the gap at lower cranking speed than regular types.

Bosch plug.

The steatite insulator, which is retained in the 1912 construction, has long been a feature of the Bosch plug. Steatite (which is manufactured under a most costly process) has exceptional insulating properties and is absolutely free from the disadvantages of porcelain, glass or mica insulators, being neither brittle nor subject to deterioration by intense heat, extreme pressure or excessive oil. The unique character and strength of these insulators make it possible to eliminate all joints from the Bosch plug, thus insuring perfect insulation and gas-tight construction, the plugs being guaranteed to withstand a pressure of 750 pounds—far in excess of the ordinary pressure to which plugs are subjected.

These plugs may be used either for magneto or battery ignition, and can be supplied in standard ½-inch, ⅞-inch, and metric threads.

Asheville, N. C., has ordered a motor patrol.

WORM-DRIVEN AXLES.

Coincident with the return from Europe of W. C. Baker, president and mechanical engineer of the American Ball-Bearing Company of Cleveland, Ohio, announcement is made that the American Ball-Bearing Company has supplemented its present product by the addition of a complete line of worm-driven axles, in which the imported type of Lanchester-Daimler worm and worm wheel is to be used.

The Lanchester type of worm and gear has been most thoroughly tried out and is today widely used by a number of the prominent foreign manufacturers. It is the result of years of study and experiment and has been perfected by Mr. Lanchester in connection with the Daimler Motor Car Company of Coventry, England. The Daimler and Lanchester companies have been using the worm drive for the past ten years and have now adopted it exclusively on their entire output. It is also found as one of the distinguishing features on such well known cars as the Minerva, the Panhard and others.

Mr. Baker is convinced of the mechanical practicability of the worm and gear as applied to motor vehicles. Its value has been demonstrated abroad on pleasure cars ranging from 15 to 70 horsepower and in heavy trucks and tractor work up to 150 horsepower.

The Lanchester worm is of the design commonly known as the enveloping or hour glass type. Mr. Lanchester has perfected special machinery and cutters which entirely eliminate all hand-finishing operations, and leave the worm and gear absolutely true in tooth form.

Mr. Baker was accompanied on his trip by Charles E. Davis, general manager of the Warner Gear Company, of Muncie, Indiana. This company has contracted with the Daimler company and with Mr. Lanchester for the exclusive right to the Lanchester worm and worm wheel for the United States and Canada.

The American Ball-Bearing Company has in turn concluded a contract with the Warner Gear Company which confers upon it the sole rights, as axle manufacturers, for this type of drive.

BOOM IN MOTZ TIRES.

Many owners of light motor wagons are now using Motz cushion tire equipment in order to protect the mechanical parts of their machines from violent bumps and shocks due to rough roads, and there can be no doubt about the wisdom of this move in cases where speed is an important essential.

The Motz cushion tire obtains its exceptional easy-riding qualities by its physical construction.

It has double treads, which are notched, giving the non-skid feature; also distributing the weight to the undercut sides. The undercut sides are supported by slantwise elastic bridges, which give and yield like the air in a pneumatic tire.

Another remarkable feature of Motz cushion tires is durability. They are guaranteed for 10,000 miles—two years. And in nearly every case they far outstrip their guaranty.

Motz cushion tires are easily applied by small hand tool. They fit any standard clincher quick detachable or demountable rims. The man who uses Motz cushion tires never has his car and driver made idle through tire troubles. Even if a tire need be replaced it only requires five minutes to do it.

Motz tires are being exhibited at the Chicago show in space 2-3. They will be on view at the Boston show (March 13 to 20) in space F 535-536.

NEW HAZARD CATALOG.

The new catalog of the Hazard Motor Mfg. Co. deserves careful attention by all automobile engineers as well as by everyone interested in the subject of power plants.

The first cut illustrates the complete Hazard power plant, which consists of a 4-cylinder, cycle motor, and a 3 speed forward and reverse selective type transmission, in one unit, connected by a multiple disk clutch of 16 hardened, tempered and ground steel plates, running in oil; one pedal for operating clutch and brake (separate pedal for brake furnished if required), starting crank arranged to stand in vertical position; oil and water pumps, fan, fan pulleys, endless woven fan belt, one set spark plugs (can arrange for 8 plugs if desired), rear suspension tube any length to meet requirements; priming cups, manifolds, carburetor and magneto connections, with center (or right or left) control mounted on transmission. The specifications are fully illustrated with cuts.

Part of the catalog is devoted to a description and illustrations of the Hazard motor wagon power plants. Among the special features is a throttle governor operating entirely independent of the carburetor. The speed of the motor wagon, as controlled by the governor, can be regulated by the owner. All parts are inclosed and cannot be tampered with by the driver.

Another point of interest is the special gear reduction box on the rear end of and integral with the transmission—a new feature for use on heavy cars using shaft drive. This gives an additional reduction of 2½ to 1. (Different ratios can be supplied on quantity orders.)

The last page of the catalog is occupied with the wording of the Hazard guaranty, which has no time limit.

Anyone interested may secure a copy of the Hazard Catalog by addressing the Hazard Motor Mfg. Co., Rochester, N. Y.

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BALL BEARING TREATISE.

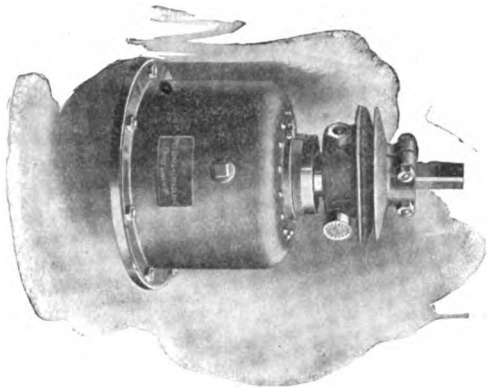
An interesting and valuable contribution to the ball bearing literature of the present year is the Engineering Edition of the 1912 catalog-treatise, issued by The New Departure Mfg. Co., of Bristol Conn. This is fresh from the press, contains 76 pages, and has been prepared by the company's staff of ball bearing specialists and engineers. It gives valuable information of a technical character, and is fully illustrated by fine engravings.

The New Departure Mfg. Co. offers to send this catalog on request to manufacturers, purchasing agents, designing and mechanical engineers, and other responsible persons who are interested. Such requests should be made on the letterhead of the firm with which the inquirer is connected.

NEW DEPARTURE QUINTETTE.

These gentlemen are the members of the sales and engineering forces of the New Departure Mfg. Company, of Bristol, Conn., who were responsible for the extensive exhibit of the New Departure ball bearings, which was one of the interesting features of the Madison Square Garden Show just closed, and created a most favorable impression.

Dewitt Page, secretary and sales manager, has been with the company for more than 20 years, and has probably planned and carried out more exhibits in the "Garden" than any other exhibitor at this last show. Mr. Dusinberre is in charge of the Detroit office, assisted by Mr. Ide.



Merchant & Evans clutch.

Frederick R. Hughes is chief of the New Departure engineering staff and Mr. Jennings is his assistant.

The quintette will be in attendance at the Chicago Show, establishing headquarters at Suite J, Rooms 1, 2 and 4, Congress Hotel Annex, where they will be glad to welcome the trade with characteristic New Departure courtesy. A few of the ball bearing stick pins such as were given out at New York have been made up for distribution to Chicago visitors.

The White Company has recently shipped a number of motor wagons to Rio Janeiro.

EVANS CLUTCH AND CHAIN CASE.

An improved design made for years by the Merchant & Evans Company, of Philadelphia, combines a light, strong, simple, durable and accessible chain case with the jackshaft transmission. The wedge action of the V grooves of the Evans pattern of Hele Shaw clutch gives great power in driving with light pedal pressure; while for slipping, the great number of surfaces and their area make the clutch flexible and easily manipulated. The pack of wedge grooved disks running in a lubricant adapts the car for hard and trying service. The clutch is made to do this work as its ordinary duty; not as a special function only possible to a skilled driver. The load is distributed over all the surfaces in contact, and the great number of plates with their large thoroughly lubricated wedge area places but a fraction of the load on each part, thereby preventing undue wear.

When the clutch is let in, the pack of plates is compressed by springs and the V grooves intermesh, gradually bringing the driven series to the speed of those driving, but before the surfaces actually touch the oil is forced out from between them. It is this cushion of oil in the peculiar form of these plates that makes "fierce" engagement impossible, a factor of the greatest importance.

The "New Departure Quintet" of real workers.

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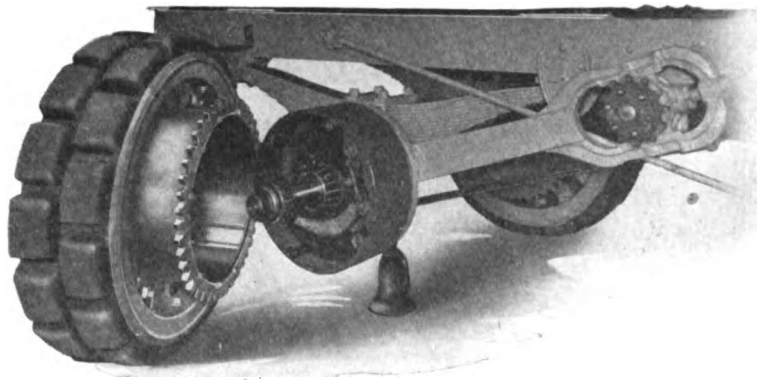

Rear wheel equipment on the 4-ton Mogul power wagon.

MOGUL POWER WAGONS.

With abundant capital behind them, experience dating from the beginning of the motor wagon industry, and no expensive traditions to hamper them in bringing their equipment and design abreast of the times, the Mogul Motor Truck Company, of Chicago, Ill., has evolved a line of heavy duty motor wagons which represent the best accepted practice in this branch of the automobile business. Mogul power wagons are built in 2, 4 and 6-ton sizes, sufficient for any line of road transport except quick, light delivery work.

Mogul motor wagons have been designed from the ground up for commercial service, as is shown in such details as their powerful braking equipment, the long and broad springs used on them, and the large diameter wheels with which they are equipped. The wheel diameter on the 4 and 6-ton models is 40 inches, which lessens the road shocks and greatly reduces the tire account—usually the biggest single item of upkeep expense of any motor vehicle. The generous proportions of the tires themselves—36 by 7 inches single in front, 40 by 6 inches dual in the rear, in the 6-ton model—also tend to keep down the operating costs to the irreducible minimum.

The proportions of the other parts of these machines are also indicative of the fact that the Mogul machines are truly commercial motor wagons and not rehashed pleasure car chasses fitted with truck bodies.

The motors in the 4 and 6-ton models are the well known Continental T head type, 5 by 5¾ and 5¼ by 5¾ inches, bore and stroke, respectively. The 2-ton machine has a vertical, 4-cylinder, L head type motor, bore 4⅛ inches and stroke 5¼ inches. In the 4 and 6-ton motor wagons the cylinders are cast in pairs; in the 2-ton machine, en bloc. Crankshafts are of the 3 bearing type, in accordance with the modern practice. Lubrication is of the splash, constant level system. Selective type transmissions, with three speeds forward and reverse, are used. Gears and shafts are mounted on Timken heavy duty bearings. The Hele Shaw clutch is standard equipment on the 4 and 6-ton models. On the 2-ton machine there is used a multiple disk clutch, with alternating disks of bronze, inclosed in an oil tight casing. Brakes, frames, springs, tires, axles and other equipment are all of generous dimensions and most modern in design.

Complete specifications of these machines will be fully given in our March issue.

BIG DEAL IN MOTOR VEHICLES.

Perhaps the most sensational announcement ever issued in connection with the handling of motor vehicles in New York city has just been put out by Wyckoff, Church & Partridge, Inc., the pioneer automobile firm at 1743 Broadway.

This firm has just entered into a contract with the Transportation Sales Company involving the purchase by the latter concern of Commer trucks and Guy Vaughan pleasure cars to the extent of a minimum of a million dollars during the year 1912. This stupendous deal takes with it the exclusive representation of Commer trucks and Guy Vaughan cars in Greater New York.

The new company will operate from the present address of Wyckoff, Church & Partridge, Inc., at 56th street and Broadway, having taken a lease of that location for its salesrooms and offices.

Wyckoff, Church & Partridge, Inc., will retain space in the same building for its general and executive offices.

The broadened plans of the new company include the erection of a large six-story building in which will be installed a complete repair shop and service department. This same building will also include a mammoth public motor wagon garage with spaces and accommodations for at least 200 motor vehicles.

Since last March when the first announcements were made by Wyckoff, Church & Partridge regarding the exclusive importation and manufacture of Commer trucks in the United States, the demand has developed greatly in excess of the ability to meet the needs of the firm's customers. In May every Commer truck which could be imported from England had been sold. By June 55 per cent of the firm's customers had given repeat orders.

The time came when the problem of selling was not so important as was the problem of manufacturing to meet the demand, and it was for this reason that the firm decided to allow others to take care of the New York retail selling, while it devoted itself entirely to the work connected with motor wagon production and agency expansion.

The Transportation Sales Company is composed of seasoned and experienced automobile men and engineers fully capable of dealing with the New York city situation.

A prime feature of their service to truck buyers is an agreement to repair and maintain absolutely free of charge for one year every W. C. P. Commer truck chassis, tires and accidents being excepted. The regular seven year warranty from the manufacturers goes with each Commer motor wagon.

WHY THEY DID NOT EXHIBIT.

Chicago motor wagon men were greatly surprised that the local firm of Nelson & LeMoon was not included in the published list of exhibitors at the Chicago show. So was the editor of this journal. He therefore telephoned to A. R. LeMoon to ask the reason, for the LeMoon motor wagon is one of the most formidable machines in its class—it never yet has been included in the "also rans" in any of the contests in which it has entered.

The answer was to the point. "We were just about to make space reservation," said Mr. LeMoon over the phone, "when we had an unprecedented rush of orders. The fact of the matter is we are all sold out and have no machines to exhibit, and the factory is working overtime to supply the demands of customers who are impatient to get deliveries."

"NOBBY TREAD" UNRESTRICTED.

The United States Tire Company is announcing to the trade and to consumers throughout the country that the manufacture and sale of "Nobby Tread" tires is continuing as heretofore.

This statement is supplemented with an announcement to the effect that the company is under no prohibition from the courts.

Application had been made for an injunction to restrain the United States Tire Company from marketing "Nobby Tread" tires pending the result of an appeal, but the Court ruled that the injunction be suspended pending the appeal.

This means, of course, that the handling of the tire will be carried on by the company in the same manner as previously.

Pneumatic tires as large as 38 by 8 inches are now being made. The shoe weighs 100 pounds and the tube 15 pounds.

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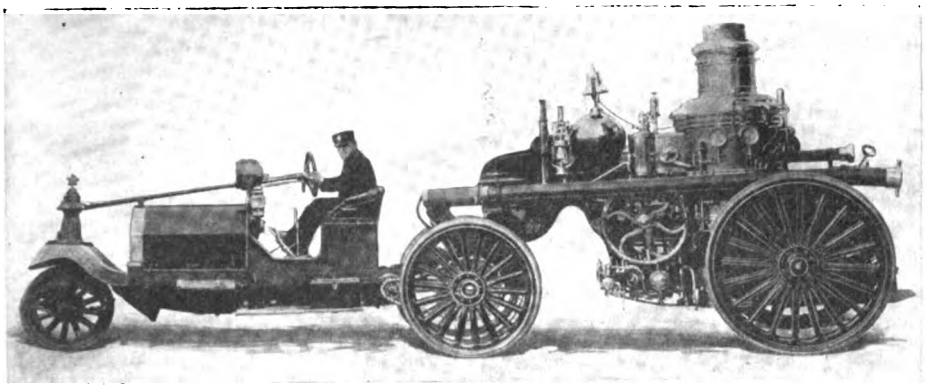

The Martin tractor, the latest product of the Knox Automobile Co.

THE MARTIN TRACTOR.

In many lines of business the nature of the goods handled is such as to require much time in loading and unloading, thus requiring the vehicle that does the hauling to remain idle many hours during the day. Merchants having this problem have been slow to adopt the motor wagon, claiming that in order to be profitable the machine must be kept moving most of the time.

The Knox Automobile Company has solved this problem with the Martin tractor. By its use the motive power—the expensive part—is kept busy, while the wagon—the inexpensive part—is being loaded or unloaded. Several wagons may be used in connection with the tractor, by equipping the wagons with jacks, one on each side. In operation, the wagon is backed to the desired position, the jacks dropped to the ground and the front of the wagon raised off the fifth wheel or circle (the rear wheels having first been blocked). The king bolt is then removed and the tractor is driven out, leaving the wagon in position for loading or unloading. The tractor may then be backed under a similar wagon, the jacks lowered, the king bolt inserted, and it is ready to be moved. The time of the entire operation need not be more than two minutes.

By this means, while one truck is loading another can be unloading and a third on the way.

CHASE FACTORY EXTENSIONS.

The Chase Motor Truck Company, of Syracuse, N. Y., has just completed its large three-story addition in Wyoming street. The new plant is remarkably complete and embodies the most advanced ideas. Some 18,000 square feet of floor space are now added to the present facilities of the company. It was thought when these improvements were started late in the summer that it would give the company admirable facilities for some time to come, but the very marked increase of business during the last three months has demonstrated that the new addition will not suffice and plans are now being discussed for still further improvements including a rearrangement of the general offices.

The Chase Motor Truck Company was, is or will be represented at most of the leading automobile shows, including New York, Chicago, Philadelphia, Pittsburg, Cleveland, St. Louis, Boston, Syracuse, Milwaukee and probably Toronto.

During the last two months a network of agencies has been spread across the country, and new ones include Milwaukee and Kenosha, Wis.; Minneapolis, Minn.; St. Louis, Mo.; Omaha, Neb.; Newark, N. J.; New Brunswick, N. J.; Baltimore, Md.; Charlotte, N. C.; Buffalo, N. Y.; Wheeling, W. Va.; Plymouth, Mass.; Springfield, Ill., and Springfield, Mo.

NOVEL DISPLAY AT THE "GARDEN."

Among the many interesting features of the Grand Central Palace Show was the gold leaf chassis of the Lippard-Stewart Motor Car Company. This concern had on exhibition in its booth a delivery car chassis entirely covered with gold leaf. The chassis was not merely painted or gilded, but every part —frame, springs, motor, transmission, clutch, axles, steering gear and wheels— was carefully overlaid with real gold leaf.

The dazzling effect of this car constantly attracted big crowds to the Lippard-Stewart booth, where, in addition to the gold chassis, there were exhibited models of the various body styles of the Lippard-Stewart delivery car.

COMPLETE LINE OF TIRES.

The Firestone Tire and Rubber Company, of Akron, Ohio, under date of January 15, 1912, makes the important announcement that it is now ready to supply six different types of tires, suitable for any kind of motor wagon of every load capacity and for any condition of service. With the completion of its new building, said to be the largest of its kind in the world, the Firestone Company is in a position to supply any demands, its splendid facilities including more than one hundred service stations on motor wagon tires.

In tires on electric trucks and pleasure vehicles, there is a choice between a special electric tire of standard design and the new cushion electric tire. The latter has a double tread and internal cavities to make easier riding. It is made in the regular side wire type and its rims are interchangeable with pneumatic rims without altering the felloe. Both tires are made of rubber that has long been known for its easy riding and economy of current consumption.

For heavy motor wagons there is in addition to the regular line a new tire with a hard rubber base. It is vulcanized in the standard endless rims but has no cross bars or side wires.

There is also a new side wire block tire with a continuous base and without metal plates. The complete line comprises six tires for resiliency and heavy service, including single and dual types. They are designed especially to permit reasonable speed and at the same time fully protect the mechanism of the machine from road shocks and thus keep down its repair expense.

Most of the Firestone tires may be used in connection with Firestone demountable rims to enable the driver to change his tires right on the spot, without having to lay up for tire repairs. The latter feature was introduced by Firestone two or three years ago and has now come into quite general use.

CHOOSING A MOTOR WAGON.

The new catalog of the Kissel Motor Car Co., Hartford, Wis., supplies a great deal of information which is extremely valuable to the prospective purchaser of a motor wagon.

As is generally recognized, the development stage of the power wagon is passed. The reliable, economical power driven truck and delivery wagon are here, and by right of their ability to cut delivery and haulage costs and expedite delivery, they are demanding immediate consideration from every business involving haulage or delivery.

The only real consideration left is the proper application of power haulage to individual needs and requirements—and it is in the discussion of this and also the comparative data between the cost of power haulage and horse haulage that the KisselKar catalog is of exceptional value to any man whose business involves haulage and delivery.

Another special value of the KisselKar catalog is the assistance it affords in selecting the truck of right capacity to be the most economical under the conditions of service in which it will be used. While describing the entire KisselKar line, both pleasure cars and motor wagons, the KisselKar catalog is far broader in scope than is ordinarily expected of a catalog, in fact it is one of the most comprehensive, informing automobile books ever published and distinctly of value to the prospective purchaser of either a pleasure car or truck.

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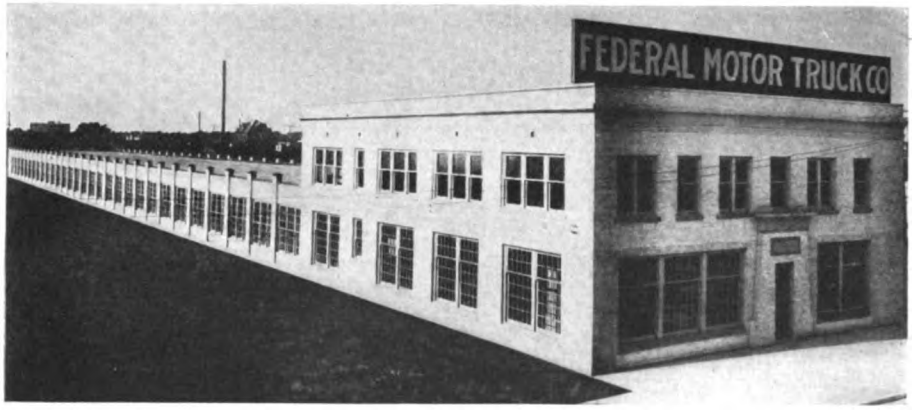


New Federal factory.

BIG TIRE DEMAND FOR 1912.

An idea of the marvelous growth of the motor car industry and its allied interests may be gathered from an estimate of the number of tires that have been manufactured in this country during the past five years. Such an estimate has been made by R. R. Drake, manager of the service department of the United States Tire Company.

"I figure," said Mr. Drake, "that since the beginning of 1907, the tire makers of America have marketed in the neighborhood of 8,000,000 pneumatic tires, the yearly output being as follows: 1907, 900,000; 1908, 1,050,000; 1909, 1,350,000; 1910, 1,800,000; 1911, 2,900,000; total 8,000,000. While 1911, as will be observed from these figures, proved the biggest year for tire makers in the history of the industry, there is no question but 1912 will beat it. In fact, we are looking for a demand that will approximate 4,000,000 tires. And when you get to calculating tires in millions, as manufacturers must do at the present time, you gather an idea of the sizable proportions of the industry."

NEW FEDERAL FACTORY.

The Federal Motor Truck Company has purchased the plant, buildings, machinery and equipment of the Van Dyke Motor Car Company. This property, which is at Junction and Leavitt avenues, Detroit, is advantageously situated as regards shipping facilities, being right in the West Detroit railroad yards. This gives access to the Grand Trunk, Lake Shore, Michigan Central and Wabash railways, the last two having side tracks into the factory yard.

The property includes 3½ acres of land with 200 feet front and 800 feet deep. There is now on it a factory building and there is room for two more buildings of the same size. The present building is 60 by 512 feet, one story high except the front, which is two stories. The upper story, 80 by 60 feet in size, contains the offices. The factory building is of white brick and of modern construction throughout. The equipment of machinery is very complete and is in excellent condition, being practically new. The power house is separate from the main plant and is capable of taking care of a plant twice the size of the present one.

This new factory will give the Federal Company a capacity of at least 1,000 motor wagons a year and provides plenty of room for further expansion as necessity arises.

Massachusetts has 2,200 "commercial motor vehicles," according to a recent return.

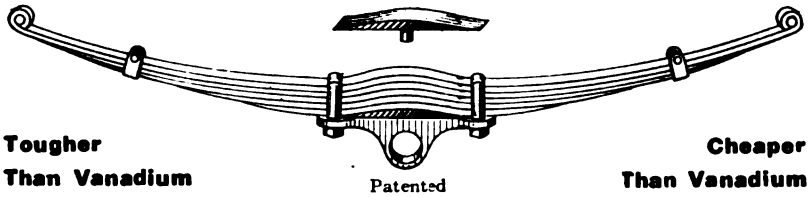
Binghamton, N. Y., has ordered a motor police patrol, to cost $2,150.

Good Trucks are "Good" Only Insofar as Their Springs Hold Up.

RIGHT

TITANIC SPRINGS

NEITHER NIB NOR HOLE IN CENTER TO HASTEN A BREAK



Tougher Than Vanadium —TESTS PROVE

Patented Feb. 15th, 1910

Cheaper Than Vanadium —PRICE PROVES

Plain Business Sagacity Demands Investigation of Our Claims.

RIGHT

READ THIS STORY AND STUDY THE TABLE OF COMPARATIVE TESTS

"Titanic Springs" are made of Titanium Steel, which is *proved* by vibratory tests to be tougher than Vanadium.

Titanium performs the same office as Vanadium, that of cleansing and toughening the steel. It removes the nitrides and is the most powerful of deoxidizers, oxygen and nitrogen being two of the greatest causes of brittleness.

Vanadium is used only in connection with Chromium in spring steel. It makes an expensive steel one that demands great care in tempering, and is also difficult to manipulate.

Titanium is used without the addition of Chromium, making a much less expensive steel; one that will stand much abuse, and is easy to work. Vanadium steel has been extensively advertised; while the use of Titanium Steel has been growing quietly during the past three years, till it exceeds that of any other Alloy Steel.

All steels break sooner or later under vibratory tests. This is called "fatigue." Titanium is said by the best authorities to raise the anti-fatigue limit.

Our repeated tests of various spring steels proves that *it does.*

So much for the material in Titanic Springs.

Now as to construction:

Springs well proportioned and tempered seldom break, except because of fatigue. Fatigue takes place at the weakest point in the plate where the movement of the molecules is greatest. This is generally at the center hole (or center nib which is just about as bad).

Titanic Springs have neither nib nor hole in center. They should thus be free from breakage at the center, and this our experience confirms.

The following are the best average results obtained after repeated tests of Half-Springs of given dimensions:

QUALITY OF STEEL		NUMBER OF RECIPROCATIONS
Electric Steel	With Center Hole	21,600
Vanadium Steel		31,500
Fine Carbon Steel		32,400
Chromium Steel		37,620
Nickel-Chrome Steel		43,800
Vanadium (another make)		44,000

TITANIC SPRING—*No Center Hole* 70 300

Thus, by leaving the center of the spring undisturbed, as in The Titanic, a spring of moderate price becomes *far better* than the highest priced spring.

On these facts we bid for your patronage.

30 years of experience and a GREAT PLANT at your service | **TUTHILL SPRING CO.,** 772 WEST POLK ST., **CHICAGO** | 30 years' experience has taught us what to do and "how"

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KENNEDY'S NEW WORK.

The Baker Motor Vehicle Company, Cleveland, Ohio, has recently secured the services of William P. Kennedy, the well-known consulting electrical engineer, of New York, who will act in the capacity for that company of superintendent of the Bureau of Service Efficiency, the purpose of which is to guide the prospective buyer of motor trucks to the proper solution of his particular transportation or delivery service problem.

Mr. Kennedy has for some time been definitely affiliated with the Baker Company as its consulting Transportation Service Engineer. The new responsibility which has been put upon his shoulders places him at the head of the Baker Transportation Efficiency Department. This will be but a more definite carrying out of what has always been one of the basic principles in the company's administration. Before any installation of electric trucks has been made it has always been expedient and necessary to the best interests of the buyer and manufacturer, before an absolute guarantee of its economy or efficiency over the horse-drawn type was given, to make a thorough study and analysis of the service in question, thereby establishing each installation upon a true scientific basis. The strength of this department will be materially increased by having connected with it a man possessing such a broad and intimate knowledge of the possibilities of the electric motor truck. By virtue, also, of Mr. Kennedy's broad experience and deep knowledge of the subject of motor trucking, the possibility of error or exaggeration in any installation which he might recommend will be eliminated.

NEW VELIE AGENCIES.

The Velie Chicago Branch has closed agencies with the J. F. Charley Auto Company, Evansville, Ind., and the Moran Auto Sales Company, Grand Rapids, Mich. Velie service stations will be established throughout these territories.

NEW MAIS OFFICERS.

Will H. Brown was re-elected president and general manager of the Mais Motor Truck Company at a meeting of the directors and stockholders held in Indianapolis on January 9 last. New capital has been obtained and the company is once more on a solid basis. Under the agreement with the creditors of the company by which the receivership suit was dismissed, the creditors will be represented in the management of the company's affairs by an executive board.

This board and other new officers were elected. J. D. Stimson was selected to succeed Albert Mais as vice-president, and Alvin S. Lockard was named secretary and treasurer to succeed Hiram Moore, who recently succeeded Albert Markam. Mr. Stimson is a hardwood lumber manufacturer of Huntingburg, Ind., and Mr. Lockard is an Indianapolis man. The executive board as named recently follows: J. D. Stimson, Alvin S. Lockard and H. G. Francis, a Rushville furniture manufacturer.

The Mais company has purchased the old Jenney electric plant, where it has been located and will remain there permanently.

CASE BUYS STEPHENSON.

Announcement is made by officials of the J. I. Case Thrashing Machine Company, Racine, Wis., that that concern has taken over the Stephenson Motor Truck Company of Milwaukee. Plans are being made to make the Stephenson plant one of the greatest of its kind in the country. New buildings will be added to the plant and the Case company will begin the exhibition of the Stephenson truck as a part of its output at the coming show at the Coliseum.

Vanadium is being mined in large quantities in Sierra County, New Mexico.

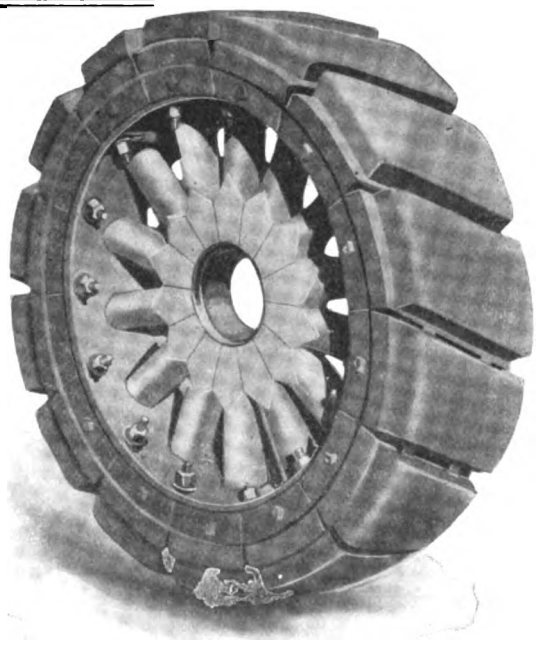
CLASSIFIED ADVERTISING.

Advertisements under this heading are charged for at the rate of three cents a word, including address; minimum charge $1 *for each insertion; no illustrations; cash must accompany order.*

WANTED—Reliable agents to sell our 3-ton, 4-ton and 5-ton gasolene motor trucks. Abendroth & Root Manufacturing Co., 320 Fifth Ave., New York City.

GREATER TIRE ECONOMY EFFICIENCY

MOTOR TRUCK OWNERS can not afford to have interruptions from continuous daily service on account of road delays occasioned by tire troubles.



Diagonal Block Tires!

Each Diagonal Block demountable in 10 minutes, accomplished by removing 4 bolts.

FITS ANY WHEEL

The use of DIAGONAL BLOCK TIRES absolutely insures a saving of at least ONE CENT PER TIRE MILE COST when fitted to motor trucks of 3 tons or more capacity.

Write for descriptive booklet

THE DIAGONAL BLOCK TIRE CO., Urbana, Ohio

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Torbensen Gear & Axle Co., Bloomfield, N. J.

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CARBURETORS.
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Motz Tire & Rubber Co., Akron, O.
Polack Tyre Co., New York City, N. Y.
Republic Rubber Co., Youngstown, Ohio.
Swinehart Tire & Rubber Co., Akron, O.
U. S. Tire Co., New York City, N. Y.

TRANSMISSIONS.
Cameron Car Co., Beverly, Mass.
Covert Motor Vehicle Co., Detroit, Mich.
Driggs Seabury Ordnance Corp., Sharon, Pa.
Hazard Motor Mfg. Co., Rochester, N. Y.
Muncie Gear Co., Muncie, Ind.
New York Gear Works, Brooklyn, N. Y.
Syracuse Gear Co., Syracuse, N. Y.
Warner Gear Co., Muncie, Ind.

UNIT POWER PLANTS.
Hazard Motor Mfg. Co., Rochester, N. Y.

UNIVERSAL JOINTS.
Blood Bros. Machine Co., Kalamazoo, Mich.
Kinsler-Bennett Co., Hartford, Conn.
Spicer Mfg. Co., Plainfield, N. J.

WHEELS.
Hayes Wheel Co., Jackson, Mich.
Schwartz Wheel Co., Philadelphia, Pa.

WHEEL MAKING MACHINERY.
Defiance Machine Works, Defiance, O.

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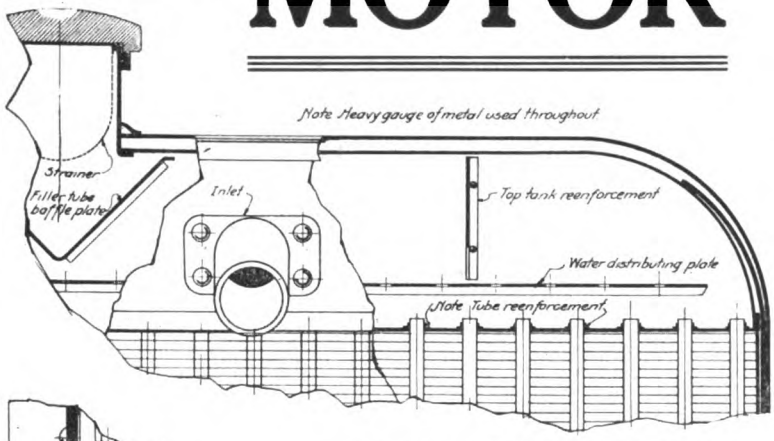
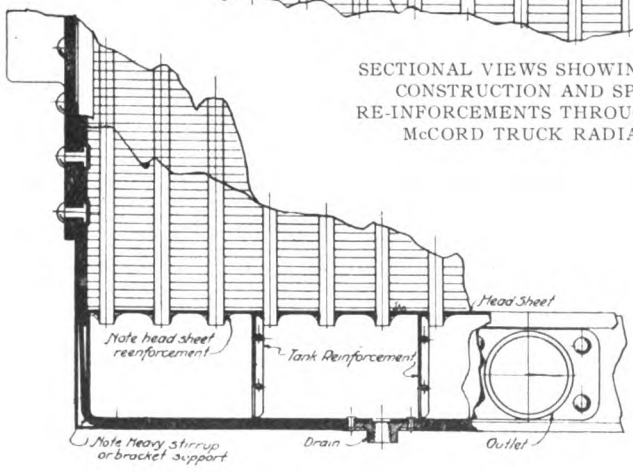
McCORD

TUBULAR RADIATORS FOR — MOTOR TRUCKS

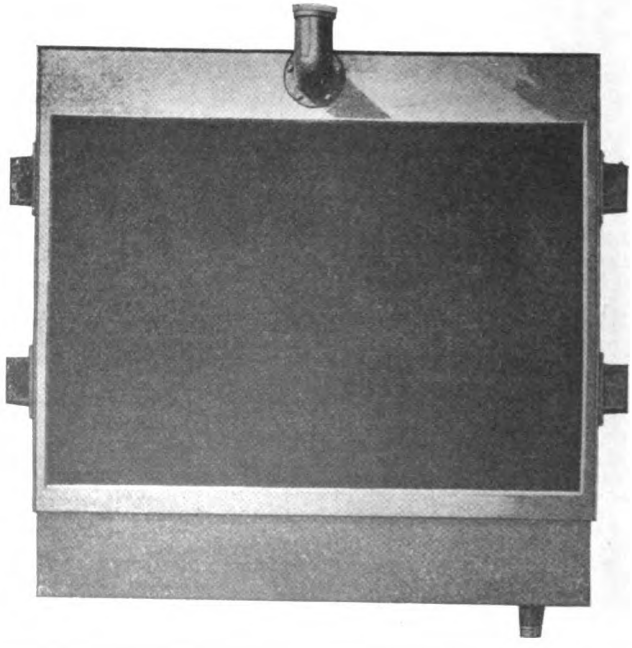




SECTIONAL VIEWS SHOWING HEAVY CONSTRUCTION AND SPECIAL RE-INFORCEMENTS THROUGHOUT IN McCORD TRUCK RADIATORS

MOTOR truck owners cannot afford interruptions from continuous daily service on account of delays caused by radiator troubles. ¶ After years of study it became evident to us that the **tubular type** radiator is best adapted for withstanding the violent shocks and vibrations that a ponderous, solid tire equipped motor truck must necessarily undergo.

McCORD tubular truck radiators **do not leak** and give the **greatest cooling efficiency.**



Most of the leading American trucks are equipped with McCORD radiators and are never out of service through radiator troubles.

We manufacture radiators to meet the requirements of motor trucks of all load ratings.

Send for descriptive pamphlet.

See our exhibit at the CHICAGO show.

McCORD MFG. COMPANY
DETROIT

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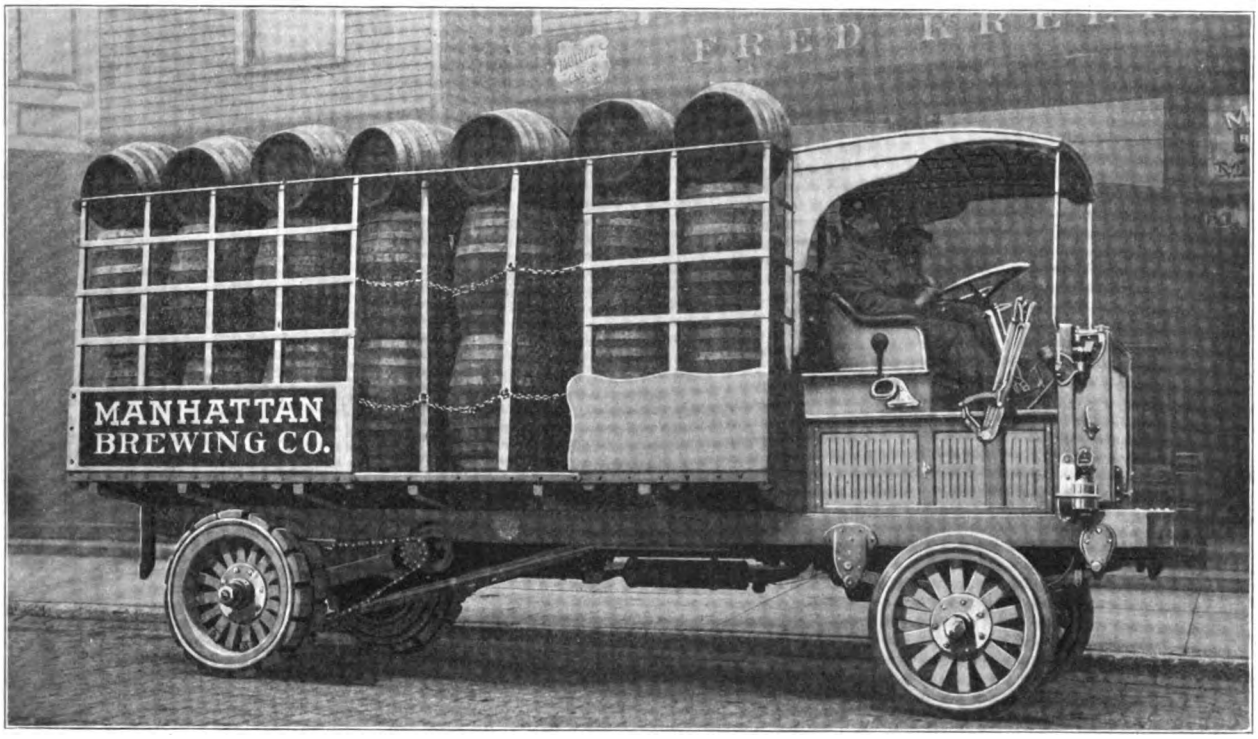
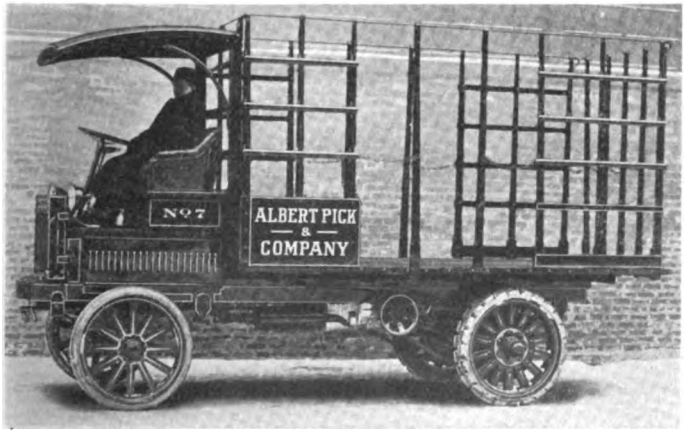


MODEL M—CAPACITY 6 TONS

MODEL O—4 TONS



MODEL G—2 TONS

Our "All Steel" Line

See Them in the Armory at the Chicago Commercial Show

We Are in Business For All Time— Our Resources Insure This

MOGUL MOTOR TRUCK CO., INC.

4000-4100 Princeton Ave., CHICAGO

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THE National Automobile Shows of 1912

Under Auspices of National Association of Automobile Manufacturers, Inc.

CHICAGO

Coliseum and 1st Regiment Armory

COMMERCIAL VEHICLES

Feb. 5 to 10

The following manufacturers will exhibit Commercial Vehicles:

Adams Bros. Co.
American Locomotive Co.
Anderson Electric Car Co.
Atterbury Motor Car Co.
Autocar Co,
Avery Co.
Baker Motor Vehicle Co.
Bessemer Motor Truck Co.
Blair Mfg Co.
Bowling Green Motor Car Co.
Brush Runabout Co.
Buick Motor Co.
Cartercar Co.
Chase Motor Truck Co.
Chicago Pneumatic Tool Co.
Clark Delivery Car Co.
Commerce Motor Car Co.
Dain, Jos.
Dart Mfg. Co.
Dayton Auto Truck Co.
Diamond T Motor Car Co.
Dorris Motor Car Co.
Durant-Dort Carriage Co.
Federal Motor Truck Co.
Garford Co.
General Motors Co.
General Vehicle Co.
Grabowsky Power Wagon Co.
Gramm Motor Car Co.
Harder Auto Truck Co.
Harwood-Barley Mfg. Co.
International Harvester Co.
Jeffery Co., Thos. B.
Kelly Motor Truck Co.
Kissel Motor Car Co.
Knox Automobile Co.
Lansden Co.
L. A. W. Motor Truck Co.
Lauth-Juergens Motor Car Co.
Lee Power Co., Henry
Locomobile Co. of America
Lozier Motor Co.
McIntyre Co., W. H.
Mack Bros. Motor Car Co.
Mercury Mfg. Co.
Mogul Motor Truck Co.
Monitor Auto Works
Motor Wagon Co. of Detroit
M. & P. Electric Vehicle Co.
National Motor Truck Co.
Packard Motor Car Co.
Packers Motor Truck Co.
Peerless Motor Car Co.
Pierce-Arrow Motor Car Co.
Pope Mfg. Co.
Poss Motor Co,
Premier Motor Mfg. Co.
Rapid Motor Vehicle Co.
Reliance Motor Truck Co.
Reo Motor Car Co.
Sampson Mfg. Co., Alden
Sandusky Auto Parts & Motor Truck Co.
Sanford-Herbert Co.
Schacht Motor Car Co.
Schmidt Bros. Co.
Service Motor Car Co.
Smith Co., A. O.
Speedwell Motor Car Co.
Staver Carriage Co.
Stearns Co., F. B.
Stegeman Motor Car Co.
Sternberg Mfg. Co.
Stephenson Motor Car Co.
U. S. Motor Truck Co.
Velie Motor Vehicle Co.
Walker Vehicle Co.
Waverley Co.
White Co.
Whitesides Commerce Car Co.
Wilcox Motor Car Co., H. B.
Wyckoff, Church & Partridge

January 27 to February 3, Passenger Vehicles, Parts and Accessories

S. A. MILES, Manager

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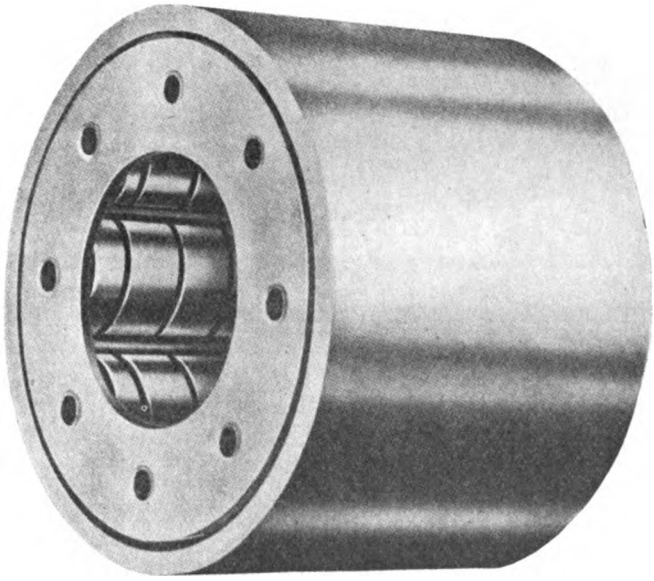

ESTIMATE, if you will, the enormous strain on the driving chains of a commercial truck when the powerful motor with its advantage of gear ratios, is pulling a load of several tons over a bad road---hauling freight under conditions as they exist about depots---and doing it day after day regardless of weather conditions.

It is only then that you can appreciate the tremendous work required of the bearings in the Transmission and Jack Shaft of such vehicles

Hyatt Roller Bearings are best suited to give long, continued service in these vital parts, because they afford line contact---are flexible, thus relieving the surrounding parts of shocks---and hollow rollers which have a self-cleaning feature that keeps the surface free from dirt and grit.

Hyatt Roller Bearings formed a regular part of the first automobiles built in America. At the present time there are millions in daily operation in every branch of motor car service.

HYATT ROLLER BEARING CO.
DETROIT, MICHIGAN

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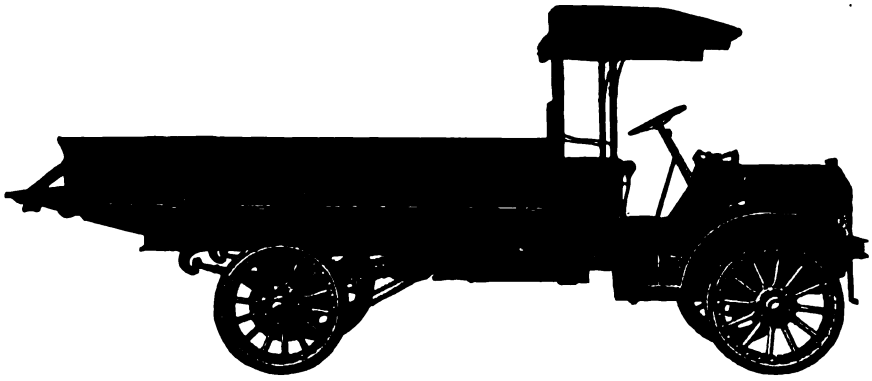
INDIANA—INDIANA—INDIANA—INDIANA—INDIANA—INDIANA



AGENTS WANTED

Some good territory still open.

We show at Chicago, Feb. 5th to 10th. Pittsburgh, Feb. 17th to 24th.

INDIANA one to one and half ton Trucks

DO you know what YOUR horse hauling costs are — cost of horses, feed, extra stable room, wagons, repairs, depreciation, and above all loss from inefficiency and accidents—all of which you pay for? Of course you do. Do you figure the average life of horses—how quickly they are "knocked out"—maybe worn out—maybe slipped and broke a leg or fatally injured (cannot be repaired)? Do you know that daily 35 to 50 horses in the large cities meet with accidents and, as a result, are killed? Get down and figure—do not fool yourself—investigate immediately the service and satisfaction in using INDIANA motor trucks in YOUR business. With ordinary care the repairs are very small—your delivery efficiency increased—your delivery expense decreased—your delivery system wonderfully improved. INDIANA trucks are mechanically constructed—very strong steel frames, axles, etc.—parts extra heavy throughout—made to withstand the extra heavy work and strain—all parts are standard tried and tested, and the completed machines are thoroughly tested before leaving the factory. INDIANA trucks are equipped with special truck type motors, giving these trucks powerful carrying ability. If you will investigate our specifications carefully you will decide that INDIANA trucks are dependably constructed—long lived—and will stand up and do the work. INDIANA trucks are a traveling advertisement for us and when in your service are a traveling advertisement for you and your business.

HARWOOD-BARLEY MFG. CO., 200 Henderson Ave., MARION, IND., U. S. A.

INDIANA—INDIANA—INDIANA—INDIANA—INDIANA—INDIANA

The Truck YOU Know Is Good

¶ If you had never seen a WHITE truck, the list of prominent concerns who own large fleets of them would convince you of their great merit.

¶ These owners first bought one WHITE truck and one of several other kinds—since adopting the motor truck on a large scale the predominance of WHITES found in their immense fleets should settle the question for anyone who is considering motor trucks.

The Best Truck For The Buyer Or For The Dealer.

The White Company

East 79th Street, Cleveland, Ohio

The Power Wagon

¶ It is well known that the "Power Wagon" prints more useful information pertaining to mechanical road haulage than can be obtained from any other source, public or private. The accuracy and extent of this information is the result of seven years of specialized effort.

¶ If you are not a subscriber to the "Power Wagon" you are out of touch with much that would be of benefit to you.

THE POWER WAGON McCormick Building, CHICAGO
(ESTABLISHED 1904)

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The WCP Commer Truck

4½-TON 5½-TON 6½-TON

A Message to Dealers

THE W C P COMMER TRUCK has these unusual talking points:

(1) We warrant W C P Commer Trucks for SEVEN YEARS from date of delivery. This warranty is unlimited regarding defective material and workmanship.

(2) Commer Trucks were made seven years ago. That was before 90% of the motor trucks in this country had left the draftsman's table.

(3) During the past seven years not one Commer Truck has ever worn out.

(4) Commer Trucks are in successful service and earning repeat orders even in such remote places as Vladivostok, Russia; Patagonia, South America; Uganda, Africa; Penang, Malay Peninsula.

(5) No motor truck in the world can successfully compete with the W C P Commer Truck in low gasoline and oil consumption.

(6) The Commer Truck has a unique and fool-proof gear box, change of speed being effected by spring operated dog clutches. Gears are constantly in mesh and cannot strip.

FOR MANY REASONS besides the proved worth of the W C P Commer Truck, dealers who represent us secure one of the fairest and most satisfactory propositions given in the motor truck field. These points are particularly worth attention:

(1) The firm of Wyckoff, Church & Partridge, retailed automobiles for eleven years. From a small shop started in 1900, sales grew so that by the first of 1911 the annual business amounted to $2,000,000. We learned what sells cars and all our retailing experience is at the disposal of dealers who are identified with us.

(2) As former retailers of six different makes of cars we know the value of avoiding the unsatisfactory conditions that at times enter the relations of the retailer with the manufacturer he represents. Every dealer identified with us secures a contract that is based upon a complete understanding of the dealers' peculiar problems.

Write us that one of our representatives may call and discuss this matter fully with you.

— and see our exhibit at the Chicago Show.

Opportunities like this do not last indefinitely—
TODAY is the best day to write us.

WYCKOFF, CHURCH & PARTRIDGE, INC

BROADWAY AT 56th STREET NEW YORK CITY

Plant at Kingston, N. Y.

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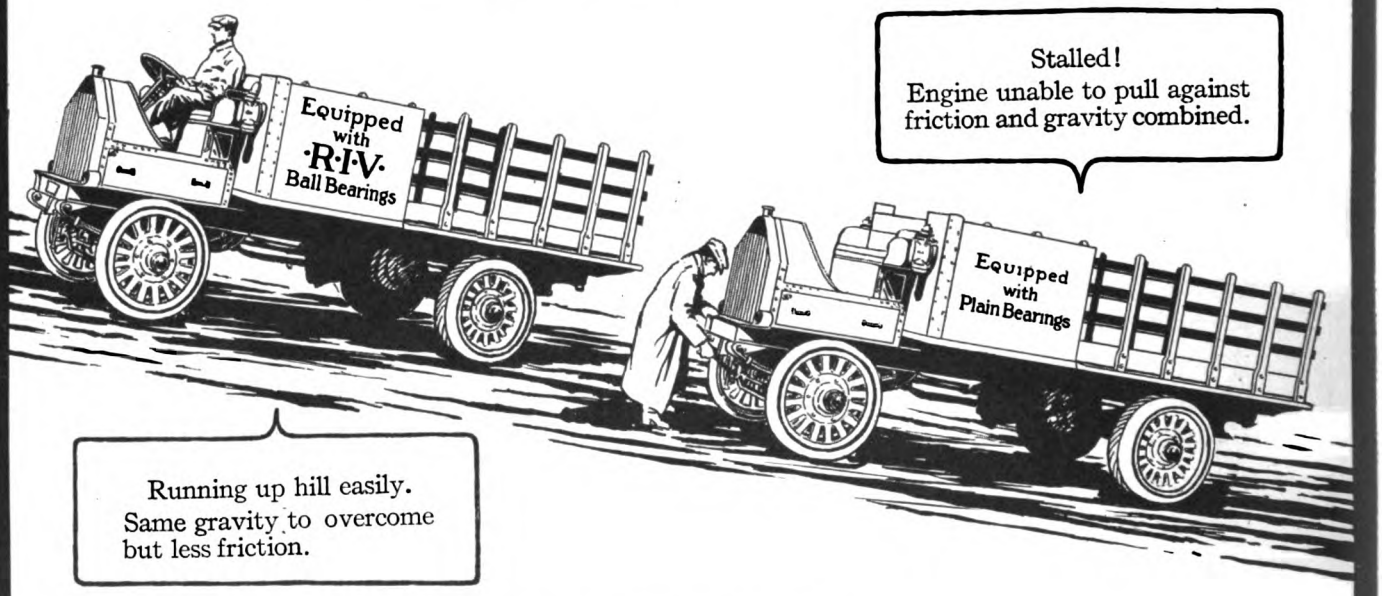
With PLAIN BEARINGS friction tells heavily on hills, but with

R. I. V.

Ball Bearings

most of the friction is overcome and much less power is required to carry up the same load.


Equipped with ·R·I·V· Ball Bearings
Stalled!
Engine unable to pull against friction and gravity combined.
Equipped with Plain Bearings
Running up hill easily.
Same gravity to overcome but less friction.

AND THE RESULT—

1. Increased hill-climbing ability.
2. Less danger of stalling motor on hills.
3. Less wear-and-tear on engine.
4. Greater general reliability and economy.

All of these are strong points that any maker of trucks would be glad to have in his specifications. R. I. V. Ball Bearings will enable him to do this.

NOTE—Send for Important Data on what many of the most prominent truck builders of this country and Europe have decided as to the relative efficiency and desirability of Ball Bearings, Roller Bearings or Plain Bearings in all parts of the vehicle.

R. I. V. Company

1771 Broadway :: New York City

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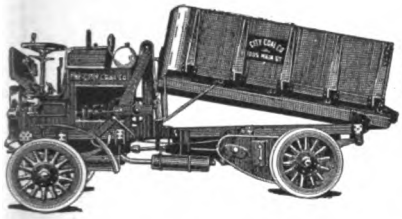
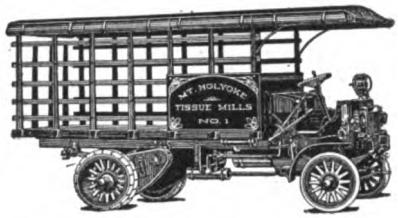


Knox



1912 Motor Trucks 1912

There Is a Knox Truck for Your Work

No matter what you have to haul or carry —if you need quicker methods, certain service and lower costs—the Knox will repeat for you what it is doing for a hundred others.

As you are in business to make money, the quickest method by far is to prevent its waste. Cut down your unnecessary cost of doing business and the profits will accumulate.

If you can move one ton of merchandise one mile with a motor truck for five cents and are now paying twelve cents with horses for the same service, the saving in a year will astonish you.

This isn't theory. A thousand merchants will testify to a large saving over their former horse equipment.

If TIME is a vital element in your transportation problem the Motor Truck is indispensable. Snow or mud, the heat of summer or cold of winter makes no difference. And its capacity for work is enormous.

The KNOX MOTOR TRUCK has been designed to help you meet the keen cost of close competition. Backed by ten years' experience we have designed a line of trucks from two to six tons capacity which are suitable for every motor need in the transportation field. And we will gladly give you the benefit of this experience in analyzing your problems of distribution or transportation on a strictly economical business basis.

Keep your transportation costs down and watch the profits mount up.

Knox Automobile Company

Springfield, Mass.

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Good Trucks are made Better Trucks When Equipped With KELLY-SPRINGFIELD Sectional Tires

It isn't the name that makes the tire good; it is the tire that makes the name good.

"KELLY-SPRINGFIELD SECTIONALS" are the most economical tires in the world.

They give more service—have longer life, consequently reduced cost.

They are easily repaired and repair cost reduced to a minimum. A new section makes the KELLY-SPRINGFIELD SECTIONAL a new tire.

They are ideal on hot asphalt roads; each section works for an instant—rests until its turn comes again.

They have plenty of room to expand lengthwise as well as laterally, thus giving double the resiliency.

The heat generated by a tire is the greatest factor in its destruction. Continued heat is death to rubber. Get rid of the heat by using a sectional tire. "KELLY-SPRINGFIELD SECTIONALS" are "air-cooled" between sections.

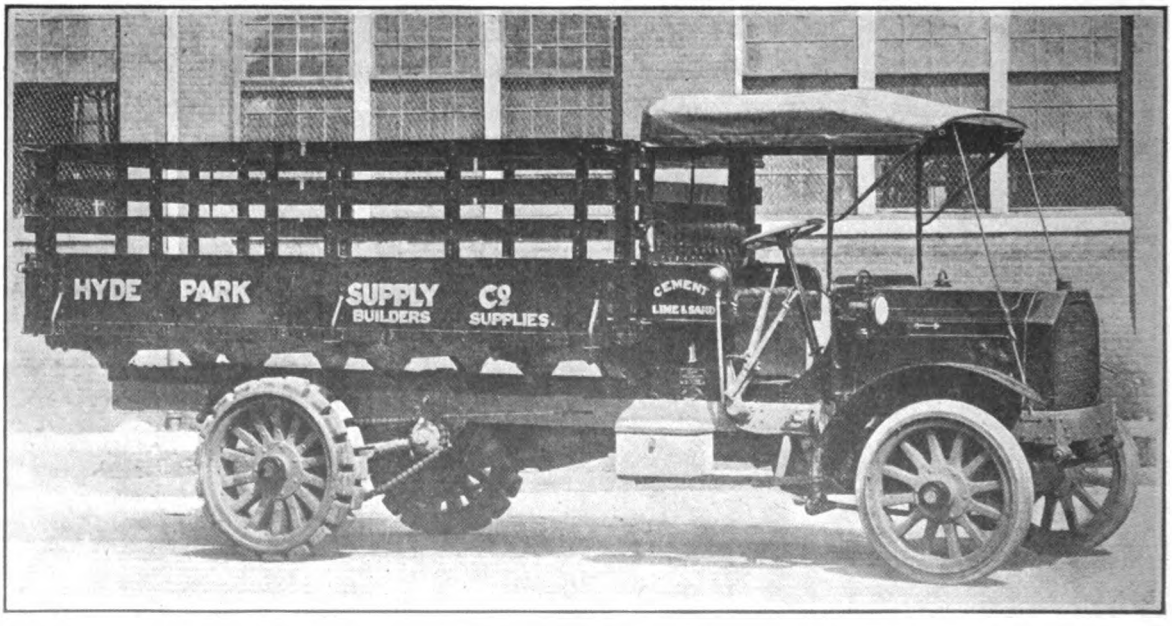
Chains are not required on "KELLY-SPRINGFIELD SECTIONALS." They grip the road—NO SLIPPING—NO SKIDDING.

Write for booklet "DROPPING PROFITS ALONG THE ROAD AND PICKING THEM UP IN SECTIONS." It's interesting reading.

KELLY-SPRINGFIELD TIRE CO.

NEW YORK, N. Y., and AKRON, O.

Branches—Boston, Mass.; Chicago, Ill.; Philadelphia, Pa.; St. Louis, Mo.; Detroit, Mich.; Cincinnati, O.; San Francisco, Cal.



Please mention the "Power Wagon" when writing to advertisers.

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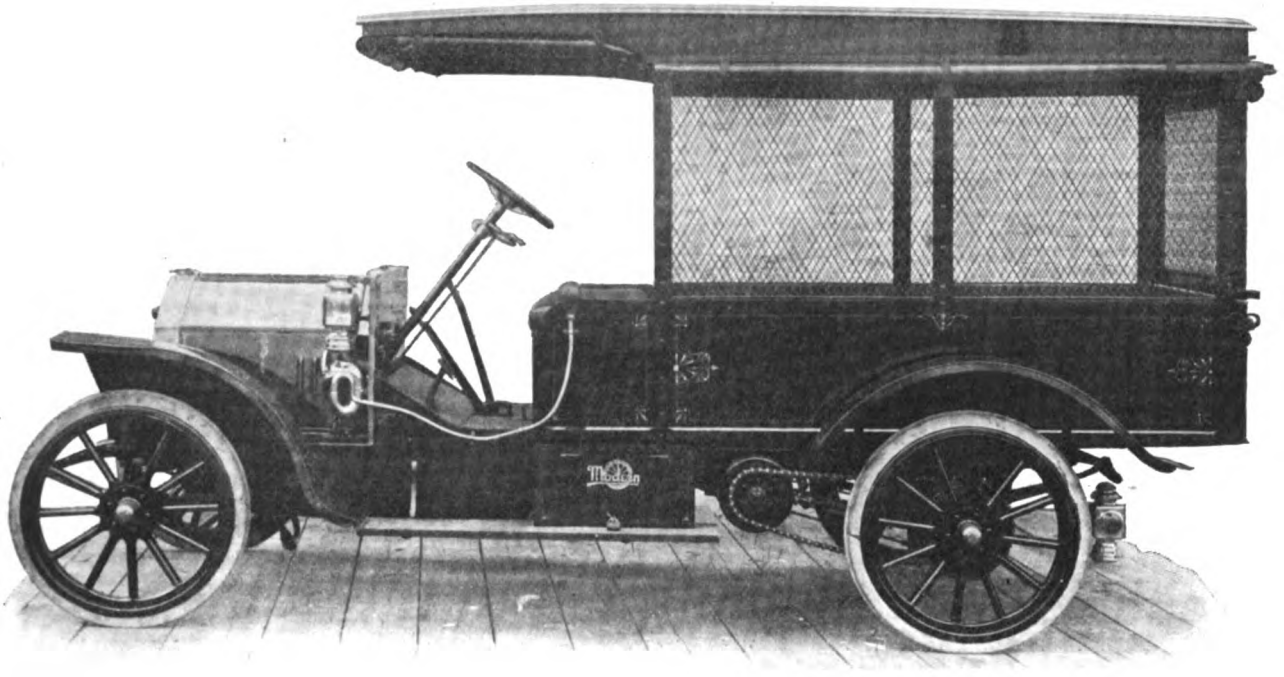
FOR SPEEDY AND FREQUENT DELIVERIES

of LIGHT MERCHANDISE

our 1000 and 1500 pound Motor Wagons

HAVE NO SUPERIORS



1000 Pound Wagon - - - Price $1200
1500 Pound Wagon - - - Price $1600

Choice territory open to agents

BOWLING GREEN MOTOR CAR CO.

BOWLING GREEN, OHIO

Write for catalog.

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BESSEMER

The Truck Without an Equal for Value

at-the-price

Since advertising our one ton truck in the January Trade Journals we find that it will be necessary for us to build them in larger quantities than heretofore. By doing this it will reduce our factory cost. The advantage of this reduction we are giving to the users of Bessemer Trucks by reducing the price on our one ton chassis to

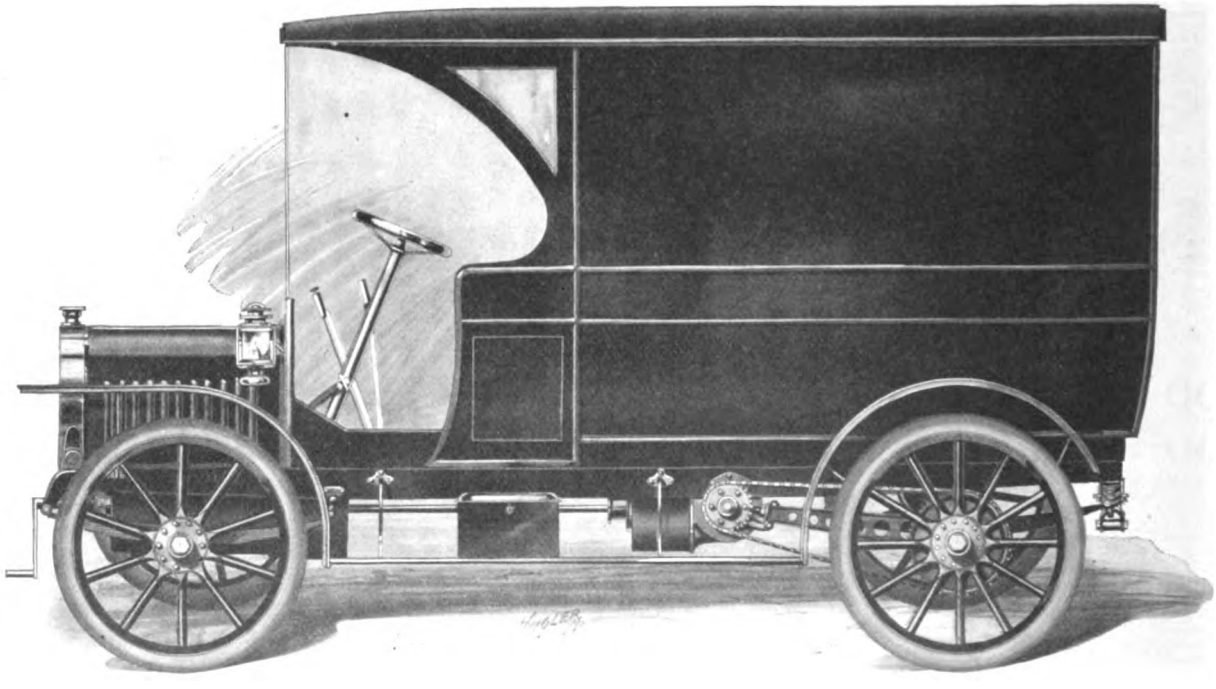
$1,800.00

In addition to this cut in price we have added a gas self-starting device as a standard equipment.

When you buy a Bessemer you get a truck fully equipped and ready for business.

Prospective buyers of trucks should not lose track of the fact that the simplicity and accessibility of the Bessemer Truck is second to none—regardless of cost. The Engine—Clutch—or Jackshaft can be removed in less than **10** minutes. This is a feature every prospective user of the Motor Truck should consider.

We have some very good territory for good hustling agents.



Capacity One Ton, Panel Body

BESSEMER MOTOR TRUCK CO.

GROVE CITY, PA.

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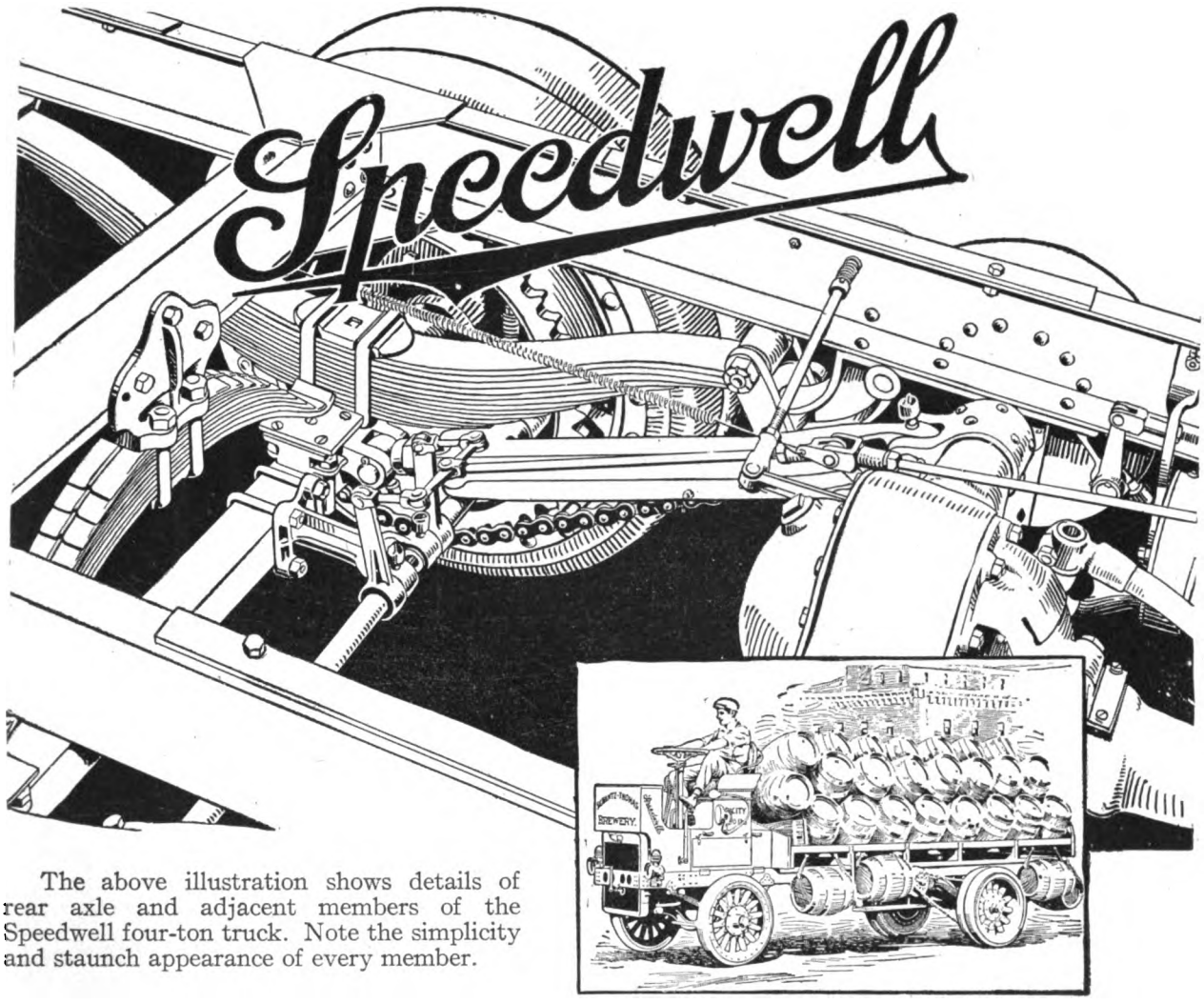

The above illustration shows details of rear axle and adjacent members of the Speedwell four-ton truck. Note the simplicity and staunch appearance of every member.

Go Over Speedwell Trucks Point by Point

You'll not find a single mechanical weakness

The key-note of the standing of the motor truck is, of necessity, efficiency.

The truck must prove its greater economy over other forms of delivery.

With this and this only in view, Speedwell Trucks are built heavier in all important members than other trucks of the same load capacity.

The tires are larger, the frame members and axles stronger, the power greater.

There are scores of features in Speedwell design that are showing their worth in the daily performance of Speedwell Trucks now in service.

On a basis of efficiency the Speedwell Truck demands your attention.

Our latest truck catalog, just off the press, will interest you.

The Speedwell Motor Car Co., 655 Essex Ave., Dayton, Ohio.

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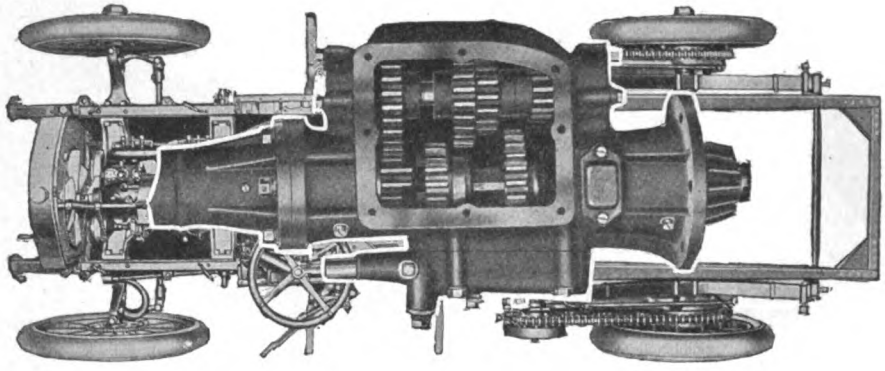
COVERT



TRUCK BUILDERS recognize the Transmission as THE PREDOMINATING FEATURE of a successful truck. Experience has proven the Covert Transmission a product of uniform high quality—a product that is dependable.

Materials of the very best grade—workmanship which has long become specialized—and years of experience in making transmissions, enables a better article to be produced at a lower cost.

There is a Covert Transmission for every type of automobile, both commercial and pleasure. While protecting you, they insure your customer. Manufacturers are invited to investigate.

COVERT MOTOR VEHICLE COMPANY
Sales Offices: Ford Bldg., Detroit, Mich.
Factory: Lockport, N. Y.

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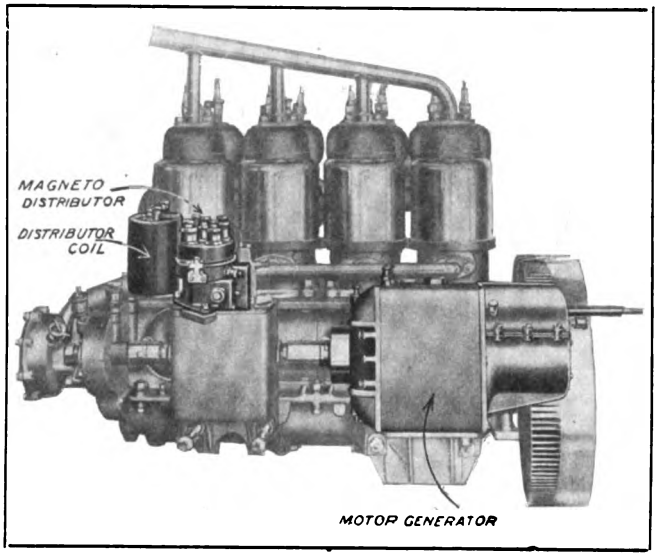
DELCO MOTOR TRUCK

Starting-Lighting-Ignition

Motor Trucks are Being Equipped with the DELCO—Starting, Lighting and Ignition System



Delco fulfills the most exacting conditions. It cranks the motor steadily for 20 minutes if necessary. But we do not stop at furnishing a self-starter. In one machine we furnish the *self-starter, electric lights,* and ignition. Each division of the apparatus performs its work better than this work has ever been performed before.

The Delco Engineering Department KNOWS what is best for your motor truck, or will find out before we will accept your order. We make 60 styles of Delco Ignition. For BETTER IGNITION SERVICE write

The Dayton Engineering Laboratories Co.
Dayton, Ohio.

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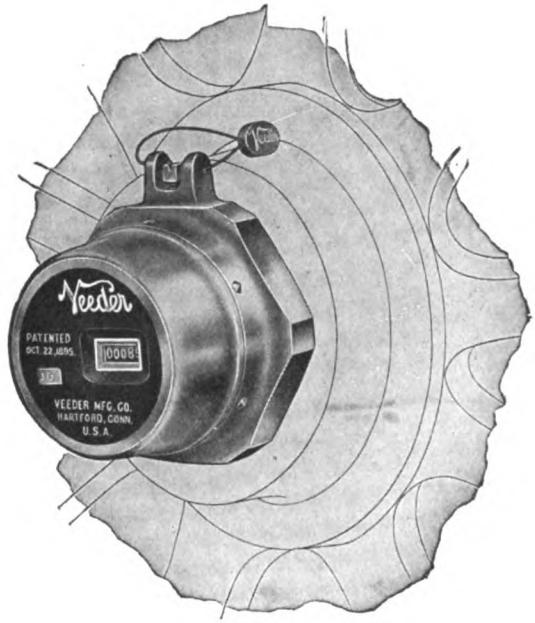
Veeder
Hub Odometer



No Commercial Car is complete without this instrument. It registers the distance traveled backward as well as forward. It cannot be disconnected by slipping gears out of mesh. The record cannot be tampered with. It is impossible to subtract mileage by running the wheel backward or to falsify returns by putting the odometer out of service during a run.

The VEEDER HUB ODOMETER is "on the job" all the time! Attached to the hub and sealed, it is impossible to alter the record without removing it. To accomplish this it is necessary to unscrew the odometer, first breaking the seal, and thereby making it apparent that the instrument has been tampered with. In no other way can the record be altered.

A valuable instrument for pleasure cars, the VEEDER HUB ODOMETER is absolutely indispensable for trucks and taxicabs. It furnishes a positively accurate record for the estimate of mileage costs. On taxicabs it furnishes a protection to the owner, eliminating every possibility of loss through drivers' dishonesty and offering a means of comparing various cars in respect to their returns and mileage.

Price complete — ready for attaching — $25.00, at your dealer's, direct from our factory or at the following depots:

T. H. CRANSTON & CO., 56 E. Randolph St., Chicago, Ill.
L. H. & B. I. BILL, 543 Golden Gate Ave., San Francisco, Cal.
THE RUBBER TIRE WHEEL CO., Montreal, Quebec, Toronto, Winnipeg and Vancouver.

The Veeder Manufacturing Co.
HARTFORD, CONN.

Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Small Die Castings.

Look At this Selfishly

It will pay you to have thre Gamm agency—if you can get it.

If you represent the Gramm you won't have to fight the Gramm.

The Gramm agency is of itself, a complete well rounded business.

The Gramm agents are busy, very busy—practically all of them have waiting lists.

They are making good money on a sure thing.

They are selling the motor truck with the best and oldest reputation in America.

We have places for a few more live agents.

We only want men who are as big as our proposition.

If that means you, wire us today.

The Gramm Motor Truck Company
111 S. Lima Street LIMA, OHIO, U. S. A.
Exclusive Motor Truck Builders

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A WINNER EVERY TIME

The Nelson & Le Moon Motor Wagons were **FIRST** in their class in every contest in which they have been entered to date.

This Cup awarded to us for making a perfect score and best Economy test in the Chicago American Reliability Run, Chicago to Detroit and Return, Aug. 8-17, 1911.

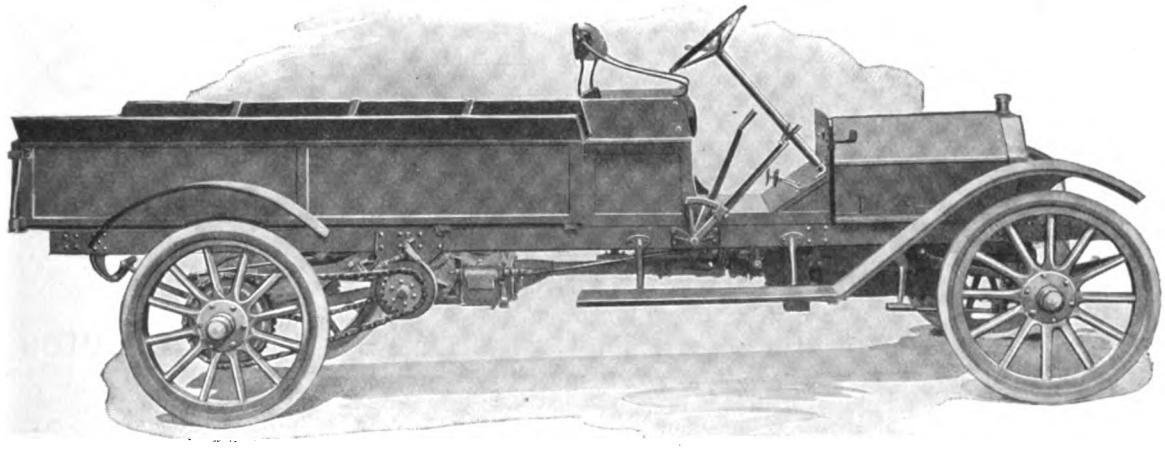
This Cup awarded to us for making a perfect score in the Chicago Motor Club Commercial Car Demonstration, Sept. 18-19-20, 1911.

We are not exhibiting at the Chicago show for the simple reason that our machines are being bought up as fast as we make them, and

WE HAVE NONE TO EXHIBIT

In fact, we are working overtime to catch up with present orders.

WE MAKE 1 AND 1½ TON MOTOR WAGONS



NELSON & LE MOON ONE TON WAGON.

CHOICE TERRITORY OPEN TO RESPONSIBLE DEALERS

Send For Catalog

NELSON & LE MOON

849-855 Kedzie Avenue

CHICAGO, ILLINOIS

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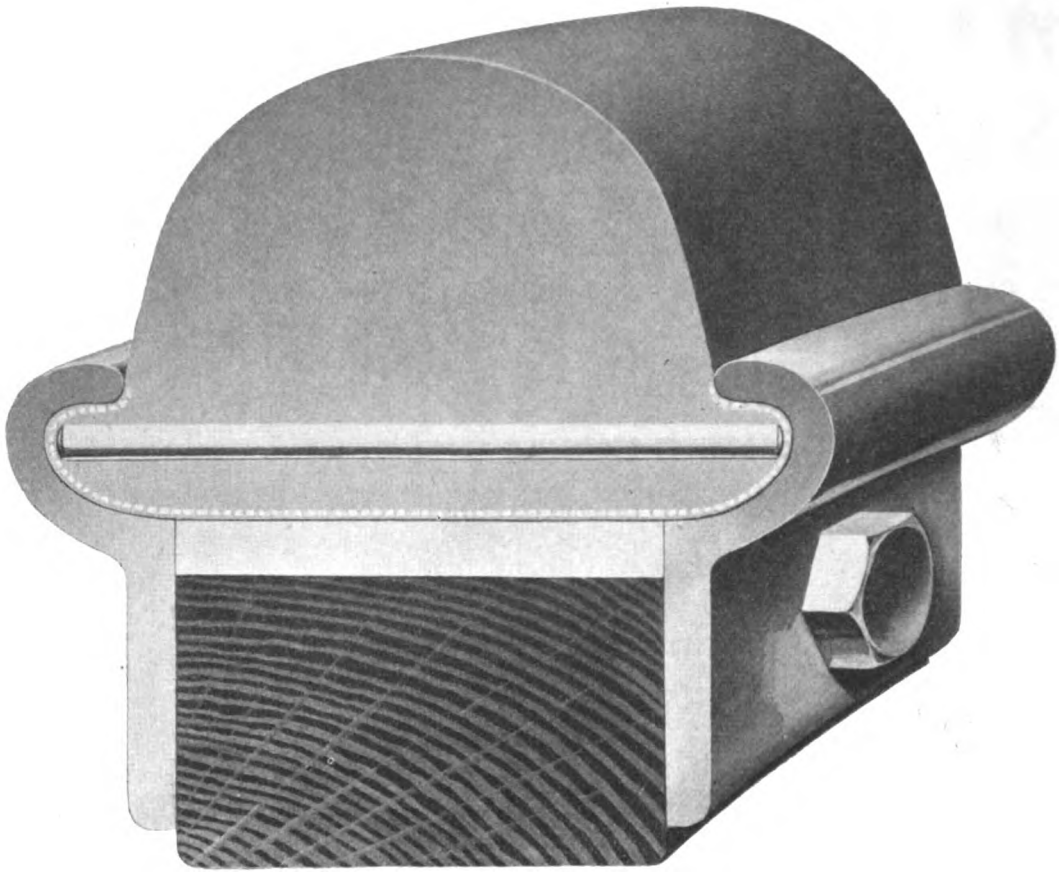

REPUBLIC MOTOR TRUCK TIRES

The greater part of disappointment and delay in your motor truck service can be eliminated by the use of Republic Motor Truck Tires.

Worn-out tires can be replaced in a few minutes by driver, without taking wheel off the truck.

Our guarantee fully protects you against inefficient service. Write for particulars.

THE REPUBLIC RUBBER COMPANY

Youngstown, Ohio

BRANCHES AND AGENCIES IN THE PRINCIPAL CITIES

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THE POWER WAGON

¶ It is well known that the "Power Wagon" prints more useful information pertaining to mechanical road haulage than can be obtained from any other source, public or private. The accuracy and extent of this information is the result of seven years of specialized effort.

¶ If you are not a subscriber to the "Power Wagon" you are out of touch with much that would be of benefit to you.

THE POWER WAGON McCormick Building, CHICAGO
(ESTABLISHED 1904)

Please mention the "Power Wagon" when writing to advertisers.

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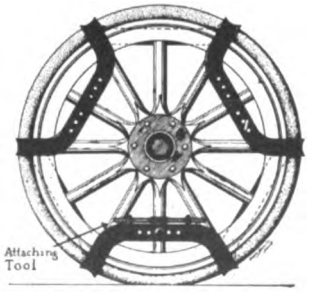
Lyon Grips in Service.

Your Trucks Can Make Their Schedule

if equipped with Lyon Grips. Snow, ice and mud don't bother them, and expense is reduced while earnings are increased.

LYON GRIPS

are a scientific solution of the peculiar problems connected with solid tires. They are not a loose-link device; and, unlike such devices when applied to solid tires, they are astonishingly durable. They last two seasons or longer in ordinary service. Lyon Grips cannot cut the tires; they are easily applied and detached, and their cost is very moderate when their mileage is considered. Our booklet tells the story fully.



If you want Lyon Grips for this season's use, do not delay ordering. We are obliged to refuse a large percentage of orders at this time of year, and to make time delivery on others. State make, size and *style* (wireless, side wire, etc.) of tires when ordering, also whether single or dual.

LYON NON-SKID CO.

431 N. Broad Street, PHILADELPHIA, PA.

Knickerbocker Trucks

Any mechanical part may be removed on the road in a half hour or less without unloading or dismantling the truck.

Write for Catalogue.

Knickerbocker Motor Truck Mfg. Co.
151st Street and River Avenue
NEW YORK

LAMBERT

The Truck of a Thousand Speeds

The Friction Drive Car; no change of gears; simple, direct transmission; fewest parts; most power at least cost. Get the facts. Interesting to agents too.

The Buckeye Mfg. Co.
164 Columbus Ave. **Anderson, Indiana**

Subscription Agents Wanted

In cities and territory where we have no agents we desire to obtain the services of active representatives for our subscription department. Apply to

THE POWER WAGON
CHICAGO

LIBERAL TERMS.

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SPELL IT WITH A LARGE "S"

SERVICE—STYLE—SAVING

SERVICE, **because** it will serve you in all kinds of weather and under trying conditions **at all hours.**
STYLE, **because** it has been designed by one of the leading designers of automobiles in this country. And also because only the **finest** material and workmanship has been used.
SAVING, **because** it will do the work of two horses and wagons under certain conditions, **and work continuously.** Because the operating expense is trivial compared to the actual service it will give you.

THIS ELECTRIC WAGON is equipped with Westinghouse motor, controller, and other equipment. All materials of highest standard. Can be equipped with Edison battery.

Absence of mechanical troubles—Simple to operate—Clean —**NO SMOKE—NO NOISE—NO DANGER.**

We sincerely believe this to be the greatest motor wagon bargain of the year.

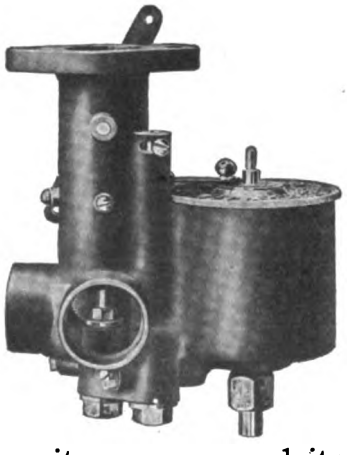
Especially designed for banks, jewelers, furriers, florists, grocers, laundries, caterers, dry goods, dyers and cleaners, confectioners, bakers, contractors, tea and coffee stores, clothiers, haberdashers, and newspapers.

CHOICE TERRITORY OPEN TO AGENTS
Write for Complete Particulars and Literature

Capacity 500 Lbs.—PRICE $850

JOLIET AUTO TRUCK COMPANY
JOLIET, ILLINOIS

A CARBURETOR
Absolutely Fool-Proof



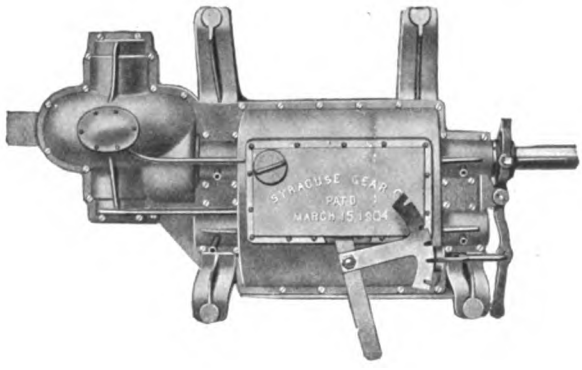
THE Zenith Carburetor Company offers truck manufacturers and owners a carburetor proved by five years experience in Europe—absolutely fool-proof and without a single adjustment.

A trial will convince you of its power, its economy and its remarkable efficiency.

Zenith Carburetor Co.
270 Jefferson Avenue **DETROIT, MICH.**

Syracuse Transmissions
PATENTED MARCH, 1904

Progressive and Selective Type Commercial Success for 10 Years



No. 4 Side Chain Drive, 2 ton Trucks
No. 5 Side Chain Drive, 3-5 ton Trucks
No. 6 Side Chain Drive, 6-10 ton Trucks
No. 80 and No. 15, Shaft Drive.
Also Planetary gears.

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Adams Trucks
"Deliver the Goods"

SEE A DEMONSTRATION

The proof of truck value is performance. The Adams Truck *at work* will show you a perfect score.

The Adams Chassis is right. It is substantial, well designed and skilfully built. The engine is particularly good. It is simple, powerful, accessible and efficient. The Truck as a whole is excellent, because every part is built for service. It is a fine looking machine, too, one of which you can be proud.

If you are not going to visit the Chicago Auto Show, write to us direct and get acquainted with the Adams Truck. "It Delivers the Goods."

THE ADAMS BROS. COMPANY, Findlay, Ohio

SPECIAL ANNOUNCEMENT

TO COMMERCIAL CAR MANUFACTURERS AND THEIR ENGINEERS

WE announce the completion of our factory, which is probably the most up-to-date in this country for the manufacture of

HIGH GRADE SPRINGS

Our plant is equipped throughout with the most improved machinery, designed especially for working the high-grade Alloy Steels, modern furnaces with pyrometers attached to each, and a complete physical laboratory; thus insuring Springs of the greatest uniformity.

While our factory is new and modern, it is under the direction of Superintendents of long experience and acknowledged ability, and our workmen are skilled in the art of Spring Making.

We respectfully invite orders from manufacturers of high-grade Motor Trucks and Delivery Wagons, who require a better Spring than is generally made by the Carriage Spring Shops.

MATHER SPRING COMPANY, TOLEDO, OHIO

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A UNIQUE 32 PAGE ADVERTISEMENT

The Most Substantial Merchants in Chicago Are Using Large Fleets of Electric Motor Wagons

WHY?

Because they have thoroughly demonstrated that the electric wagon is the most dependable and economical vehicle they can use.

The Commonwealth Edison Company has been operating electric trucks for over ten years and from carefully kept records their economy and dependability have been firmly established. The Company is now operating forty-four of these vehicles and this number will soon be increased to about seventy.

Some Facts

regarding the merits of commercial electric vehicles are given in the following pages:

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The Cost of Operating Electric Wagons
In Lots of Ten

These RELIABLE FIGURES presented by the

Commonwealth Edison Company

are the result of over 10 years' careful checking on the actual performance of electric trucks in a large American city. *These figures can be bettered in Chicago.*

Let the Commonwealth Edison Company SHOW YOU

Cost of Operation—700 Pound Wagon

Mileage Per Annum—10,620 (300 Days Per Year).

Item.	Per Annum.	Per Day.	Per Mile.
Fixed Charges—			
Amortization	$155.00	$0.5167	$0.0146
Interest	46.50	.1550	.0044
Fire insurance	15.50	.0517	.0015
Liability insurance	100.00	.3333	.0094
Total	$317.00	$1.057	$0.0299
Renewal Charges—			
Batteries	$170.00	$0.5667	$0.0160
Tires	129.50	.4317	.0122
Chains	15.70	.0523	.0015
Gears and sprockets	43.55	.1452	.0041
Bearings	21.80	.0732	.0021
All other parts	25.00	.0833	.0024
Total	$405.55	$1.352	$0.0383
Garage Charges—			
Electric power	$111.00	$0.3700	$0.0105
Rent, light and heat	74.50	.2484	.0070
Garage labor	232.00	.7733	.0218
Total	$417.50	$1.392	$0.0393
Driver	750.00	2.500	.0707
Grand total	$1,890.05	$6.301	$0.1782

Cost of Operation—1,000 Pound Wagon

Mileage Per Annum—10,500 (300 Days Per Year).

Item.	Per Annum.	Per Day.	Per Mile.
Fixed Charges—			
Amortization	$220.00	$0.7333	$0.0210
Interest	66.00	.2200	.0063
Fire insurance	22.00	.0733	.0021
Liability insurance	100.00	.3333	.0095
Total	$408.00	$1.360	$0.0389
Renewal Charges—			
Batteries	$187.00	$0.6233	$0.0178
Tires	145.60	.4853	.0138
Chains	25.20	.0840	.0024
Gears and sprockets	46.00	.1534	.0044
Bearings	22.65	.0755	.0022
All other parts	30.00	.1000	.0029
Total	$456.45	$1.522	$0.0435
Garage Charges—			
Electric power	$122.35	$0.4078	$0.0116
Rent, light and heat	88.00	.2934	.0084
Garage labor	232.00	.7733	.0221
Total	$442.35	$1.475	$0.0421
Driver	750.00	2.500	.0715
Grand total	$2,056.80	$6.857	$0.1960

Cost of Operation—2,000 Pound Wagon

Mileage Per Annum—10,140 (300 Days Per Year).

Item.	Per Annum.	Per Day.	Per Mile.
Fixed Charges—			
Amortization	$265.00	$0.8833	$0.0262
Interest	79.00	.2633	.0078
Fire insurance	26.50	.0883	.0026
Liability insurance	100.00	.3333	.0098
Total	$470.50	$1.568	$0.0464
Renewal Charges—			
Batteries	$221.00	$0.7367	$0.0218
Tires	216.30	.7210	.0214
Chains	32.30	.1077	.0032
Gears and sprockets	54.00	.1800	.0053
Bearings	25.55	.0851	.0025
All other parts	35.00	.1167	.0034
Total	$584.15	$1.947	$0.0576
Garage Charges—			
Electric power	$152.10	$0.5070	$0.0150
Rent, light and heat	109.05	.3635	.0107
Garage labor	232.00	.7733	.0229
Total	$493.15	$1.644	$0.0486
Driver	750.00	2.500	.0738
Grand total	$2,297.80	$7.659	$0.2264

Cost of Operation—2 Ton Truck

Mileage Per Annum—9,390 (300 Days Per Year).

Item.	Per Annum.	Per Day.	Per Mile.
Fixed Charges—			
Amortization	$340.00	$1.1333	$0.0362
Interest	102.00	.3400	.0109
Fire insurance	34.00	.1133	.0036
Liability insurance	100.00	.3333	.0106
Total	$ 576.00	$1.920	$0.0613
Renewal Charges—			
Batteries	$289.00	$0.9633	$0.0308
Tires	286.60	.9553	.0305
Chains	37.90	.1263	.0040
Gears and sprockets	59.05	.1964	.0063
Bearings	30.35	.1011	.0032
All other parts	40.00	.1333	.0043
Total	$742.90	$2.476	$0.0791
Garage Charges—			
Electric power	$218.80	$0.7293	$0.0232
Rent, light and heat	136.15	.4	
Garage labor	232.00	.7	
Total	$586.95	$1.	
Driver	750.00	2	
Grand total	$2,655.85		

COMPARE THESE FIGURES WITH YOUR HORSE CO.

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The Cost of Operating Electric Wagons
In Lots of Ten

Cost of Operation—3½ Ton Truck

Mileage Per Annum—8,310 (300 Days Per Year).

Item.	Per Annum.	Per Day.	Per Mile.
Fixed Charges—			
Amortization	$400.00	$1.3333	$0.0482
Interest	120.00	.4000	.0144
Fire insurance	40.00	.1333	.0048
Liability insurance	100.00	.3333	.0120
Total	$660.00	$2.200	$0.0794
Renewal Charges—			
Batteries	$357.00	$1.1900	$0.0429
Tires	443.80	1.4790	.0532
Chains	58.10	.1936	.0070
Gears and sprockets	79.40	.2646	.0096
Bearings	43.15	.1439	.0052
All other parts	45.00	.1500	.0054
Total	$1,026.45	$3.421	$0.1233
Garage Charges—			
Electric power	$285.45	$0.9515	$0.0344
Rent, light and heat	147.70	.4924	.0178
Garage labor	232.00	.7733	.0279
Total	$665.15	$2.217	$0.0800
Driver	750.00	2.5000	.0903
Grand total	$3,101.60	$10.338	$0.3730

Cost of Operation—5 Ton Truck

Mileage Per Annum—7,200 (300 Days Per Year).

Item.	Per Annum.	Per Day.	Per Mile.
Fixed Charges—			
Amortization	$450.00	$1.5000	$0.0625
Interest	135.00	.4500	.0188
Fire insurance	45.00	.1500	.0062
Liability insurance	100.00	.3333	.0139
Total	$730.00	$2.433	$0.1014
Renewal Charges—			
Batteries	$425.00	$1.4167	$0.0590
Tires	618.80	2.0627	.0859
Chains	58.10	.1936	.0081
Gears and sprockets	79.40	.2646	.0110
Bearings	43.15	.1439	.0060
All other parts	50.00	.1667	.0069
Total	$1,274.45	$4.248	$0.1769
Garage Charges—			
Electric power	$330.50	$1.1016	$0.0459
Rent, light and heat	164.05	.5469	.0228
Garage labor	232.00	.7733	.0322
Total	$726.55	$2.422	$0.1009
Driver	750.00	2.500	.1042
Grand total	$3,481.00	$11.603	$0.4834

The light machines compare very favorably with the large fleet of horse wagons for which figures are given on the next page. BUT—the most impressive feature of all is, that as the load rating of the electric wagon is increased, the cost of hauling 1 ton through a given distance decreases in an astonishing manner. The comparative figures are as follows:

700 pound electric wagon . . Cost 5.272
1000 pound electric wagon . . Cost 4.054
2000 pound electric wagon . . Cost 2.309
4000 pound electric wagon . . Cost 1.461
7000 pound electric wagon . . Cost 1.101
10000 pound electric wagon . . Cost 1.000

That is, if it costs $5.27 to haul 1 ton a certain distance with a 700 pound electric wagon, it costs only $1.00 to do this work with a 10,000 lb. machine.

If ...r electric wagons beat the light horse wagons how much more will the heavy el... the heavy horse wagons? The 7000 electric wagons already in use in this co... testimony to the superiority of the electric over the horse, and this is still further en...d by the large numbers of by fleets of electric wagons operated by single concerns.

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Compare the Cost of Electric Wagons With the COST OF HORSES

The Commonwealth Edison Company

herewith presents the result of an accurate examination of the books of a large company owning and operating one of the largest fleets of horse drawn wagons in Chicago:

Operating One Double Wagon One Day, One Team, Without Helper:

2 Horses	$1.9688
1 Set Harness	.1394
1 Double Wagon	.4004
1 Driver	2.6666
Wheel Tax	.0324
Accident Insurance	.0370
Rent, Light, Heat	.7603
	$6.0049

Cost per mile $0.40 (15 miles)

Operating One Double Wagon One Day, Two Teams, Without Helper:

4 Horses	$3.9376
1 Set Harness	.1394
1 Double Wagon	.4004
1 Driver	2.6666
Wheel Tax	.0324
Accident Insurance	.0370
Rent, Light, Heat	1.1237
	$8.3371

Cost per mile $0.41 (20 miles).

The items entering into these calculations are as follows:

Cost of One Horse (Value $150) Per Day.

Feed	$0.4870
Stable Labor	0.1951
Shoeing	0.1106
Vet. and Medicine	0.0209
Stable, general expenses	0.0363
Insurance	0.0079
Interest	0.0292
Depreciation	0.0974
	$0.9844

Harness ($65) Double Set, Per Day.

Repairs	$0.0810
Insurance	0.0034
Depreciation	0.0424
Interest	0.0126
	$0.1394

Double Wagon ($250), Per Day.

Upkeep	$0.1763
Insurance	0.0131
Depreciation	0.1623
Interest	0.0487
	$0.4004

CAN YOU, MR. HORSEMAN,

Duplicate Even These Figures? Not Unless You Operate a Big Stable, and Economically at That!

It is doubtful if even 1 per cent. of the merchants owning horse drawn wagons know what their transportation actually IS costing them. Get someone to figure out costs scientifically, like the above, and then

COMPARE THEM WITH THE FIGURES SHOWING ELECTRIC WAGON COSTS

Furthermore—Will your horses **serve you** in zero weather, or when 100° in the shade, or when you need them a few extra hours a day in seasons. The ELECTRIC WAGON will do all this, and COST YOU LESS

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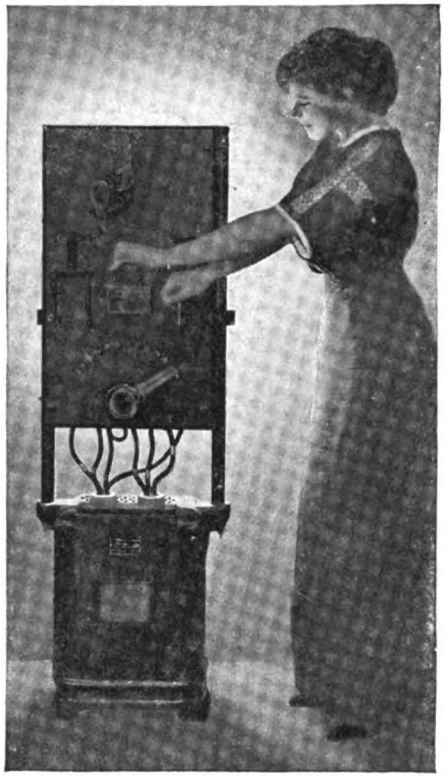
The Convenience of Battery Charging With a Mercury Arc Rectifier

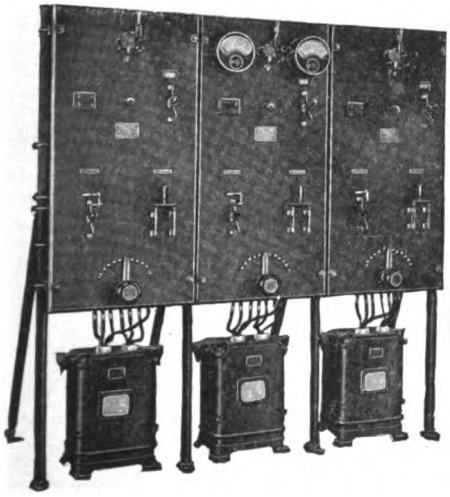
The idea that charging storage batteries is a mysterious and difficult operation has been handed down from the days of the earliest electrics when charging stations were few and far between and the charging outfit for the private garage was unknown.

These conditions have been changed by the invention of the rectifier which rectifies or changes the alternating current furnished by most lighting and power companies, to direct current suitable for charging storage batteries.



Operating the Rectifier.

With one of these rectifiers in the garage, all that is necessary to charge the battery is to insert a plug in a receptacle on the vehicle and start the rectifier. This is so easy that a woman can do it.



Three Panel Commercial Vehicle Type Rectifier. This set will charge three vehicles at once.

The rectifier takes up very little space in the garage and can be installed anywhere there are electric light wires.

In nearly every case the electric power company will make very low rates for energy for battery charging.

Write our nearest office for further information and prices.

General Electric Company

Largest Electrical Manufacturer in the World

Principal Office: Schenectady, N. Y.

Sales Offices in the following cities:

At	Charleston, W. Va.	Denver, Colo.	Macon, Ga.	New York, N. Y.	Salt Lake City, Utah.
Ba ...more, Md	Charlotte, N. C.	Detroit, Mich., (Off. of Sol'g Agt.)	Memphis, Tenn.	Philadelphia, Pa.	San Francisco, Cal.
Bi ...ingham, Ala.	Chattanooga, Tenn.	Erie, Pa.	Milwaukee, Wis.	Pittsburg, Pa.	St. Louis, Mo.
Bo ..., Idaho.	Chicago, Ill.	Indianapolis, Ind.	Minneapolis, Minn.	Portland, Oregon.	Seattle, Wash.
Bo ...on, Mass.	Cincinnati, Ohio.	Kansas City, Mo.	Nashville, Tenn.	Providence, R. I.	Spokane, Wash.
Bu ...alo, N. Y.	Cleveland, Ohio.	Los Angeles, Cal.	New Haven, Conn.	Richmond, Va.	Springfield, Mass.
Bu	Columbus, Ohio.	Louisville, Ky.	New Orleans, La.	Rochester, N. Y.	Syracuse, N. Y.

3390

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A Few Chicago Installations

ALTHOUGH the use of electric vehicles by large companies is one of the newest fields in electrical application, there are today numerous users of electric vehicles in every large city. Throughout the country electric delivery wagons are constantly being installed. Those merchants who have started with a few electric vehicles as a trial order are adding to their equipment, while others who see their satisfaction are entering the field and are delivering their goods by electrics.

The extreme ease of operation, simplicity and convenience are strong points in favor of these vehicles; in fact, from any standpoint there is very little to be desired.

In order to show just what a few of the local users of electric vehicles think of their desirability, some of these have been interviewed and their opinions are given below. The only opinions of moment in such matters are those of actual users, and all contemplating the installation of power delivery wagons may profit by reading the following items:

MARSHALL FIELD & COMPANY. This firm purchased their first modern electric vehicles about two years ago, and have secured more from time to time so that now they are operating twenty. Mr. Stanley Field says: "The service rendered by our electric vehicles has been perfectly satisfactory and free from interruptions."

CARSON PIRIE SCOTT & CO. This large store installed its first order of electric delivery wagons about two years ago. At present they have 25 in operation, most of which are of light delivery type, although two are of two tons capacity. It is estimated that each one covers 40 miles per day, and the service has been remarkably free from interruption. Their experience with the 25 electric wagons has been highly satisfactory. It is found that the simplicity of operation of the vehicles is greatly in their favor. A large number of charging stations throughout the city precludes any possibility of the charge in the batteries running too low, although, of course, the charging is done partly at the store's own garages. For city deliveries the electric vehicle is found by this company to be a most satisfactory type of machine.

WARD-CORBY COMPANY. The well known bakers, who operate a chain of stores extending across the continent from New York to San Francisco, are delivering goods to the Chicago trade by means of electric wagons. The primary installation was made about seven years ago. More have been added from time to time. About a year ago last July, 30 electrics were put in at the South side plant. At the present time the total number operated by both the South side and West side plants is 56. These range in size from 500 pounds to 1½ tons capacity.

Needless to say, the trucks are giving the best of service and their use has made the company enthusiastic over these vehicles as a means of delivery.

In speaking of the service which the electric wagons are giving, Mr. Smith, Manager of the South side plant of the company, said: "At first there was some doubt as to the size and weight of vehicle that was best suited to the work. The first vans tried were made too light for city service, while those used in the second trial were too heavy. Then a proper weight was determined upon, and the vehicles the company now have in service are far superior to any horses and wagons, and while we are not prepared to give specific figures as to actual saving over the cost of feed for horses and other expenses, we can say that this saving is considerable. The vehicles are quite clean and always ready and have many advantages. We cannot say too much of the excellence of the electric vehicles we are now using."

CHAS. A. STEVENS & BROS. [illegible] firm, who are the largest outfitters for women in the world, [illegible] in service three electric delivery wagons. The first of these was installed in December, 1909, and was a 1500 pound [illegible] more were put into service last summer.

Mr. Elmer Stevens, of Chas. A. Stevens & Bro. [illegible] find these electric vehicles very satisfactory and will probably eventually replace all horses and wagons with electric [illegible] vehicles. This will be done gradually and as the horse equipment wears out. We find the service to be reliable [illegible] ably free from trouble of any kind."

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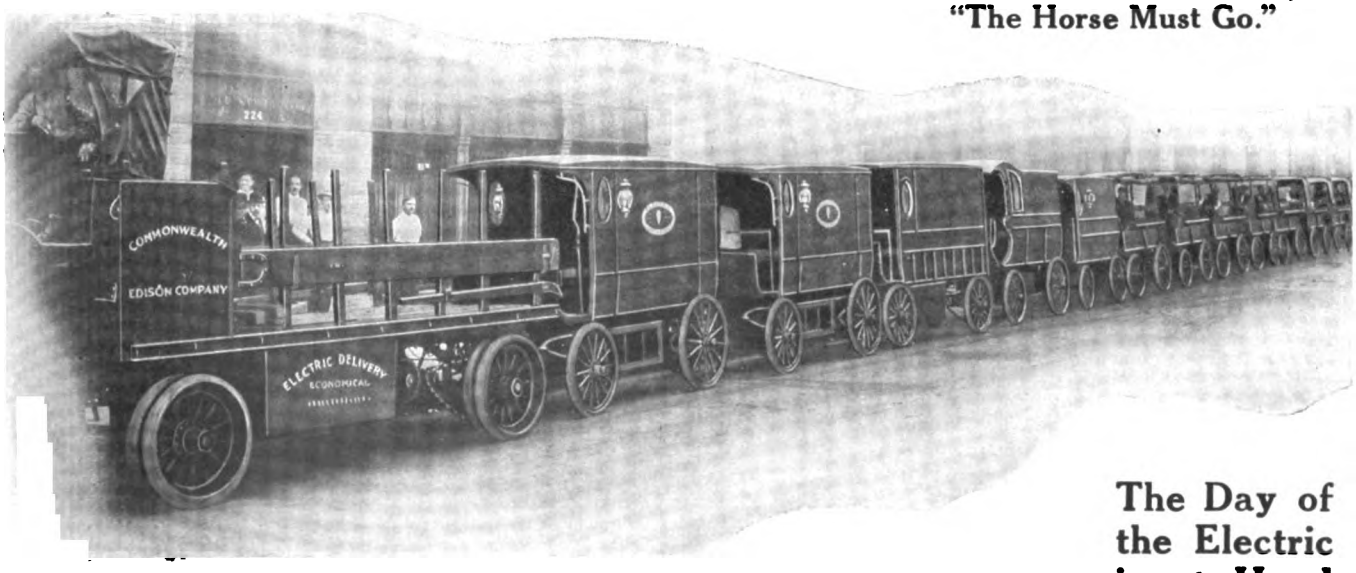
One of the Most Recent Models of Electric Wagon

THE FAIR. In September, 1911, The Fair store put in five electric delivery wagons ranging in size from 500 pounds to 1½ tons. These have delivered goods all over the city, and have traveled an average of about 35 miles per day. While the firm is as yet testing various makes of cars, both gasolene and electric, its experience has been that the electric wagons are highly satisfactory in every particular.

Mr. O. W. Lehman, Ass't Secretary and Treasurer of the Company, says: "As we have had the electric trucks in service for only about five months, we are not in a position to give definite figures as to the economies of the various types of delivery wagons. We are, however, very much pleased with our electric wagons both as to their performance and the economy of operation. They have given excellent satisfaction everywhere."

SPAULDING & CO. Last May this firm added two 1000 pound electric wagons to its delivery service. These vehicles are now in regular service, traveling about 60 miles per day. They are giving every satisfaction and the firm finds that they give exceedingly little trouble.

These Verify the Truth of Thomas Edison's Statement, "The Horse Must Go."



The Day of the Electric is at Hand

Some of the Electrics of the Commonwealth Edison Company.

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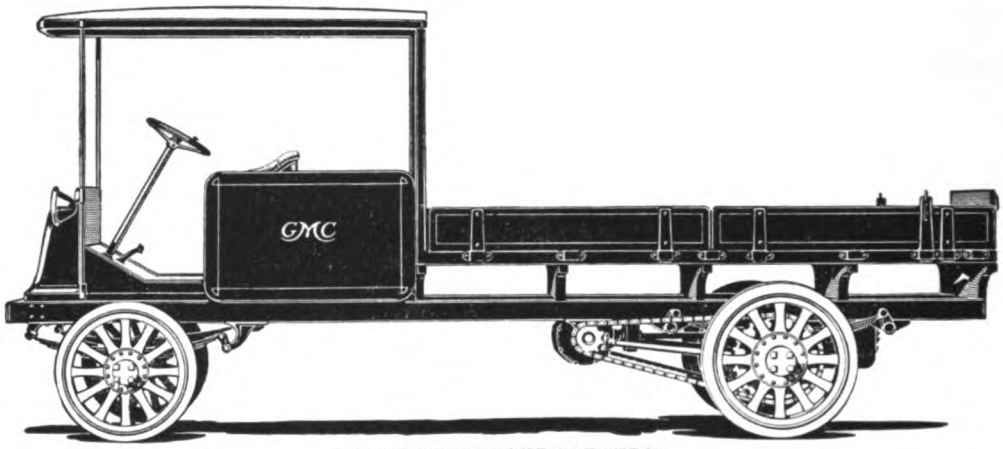
COMPLETE INSTALLATIONS — GASOLINE — GMC — GENERAL MOTORS COMPANY — TRUCKS — ELECTRIC — COMPLETE SERVICE



THREE TON STAKE ELECTRIC

GMC ELECTRICS

THE new GMC Electric is the product of John M. Lansden, Manager of the Electric Division of the General Motors Truck Company. Hundreds of his wagons, in the routine service of the largest users, have proven the commercial value of his designs and practice. His experience in construction and operation, with the unexcelled facilities and organization at hand, positively assures the immediate advantages of the new GMC Electric—another standard set after eight years for the 1912 Electric, and the logical chassis for the satisfied owner.

The GMC Electric IS new. It is designed solely for the lowest operative costs and a maximum earning power.

The General Motors Truck Company on entering the Electric field had no "established" type; no stock of parts; no tools; no set notions. The Electric Division was therefore able to produce the newest and now the best electric.

The superior facilities—engineering, laboratory, buying and manufacturing—together with adequate and unlimited resources make this electric unequalled either as a machine or as an investment.

The GMC Electric in its field is supreme as a transportation type. Reliable, economical and adaptable in application. The selection of the chassis model and type for a particular installation is readily made if the limitations are known.

The GMC Electric Chassis is manufactured in the most complete range of sizes and dimensions yet produced—24 stock models.

There are eight load or nominal carrying capacities—1000 pounds, 2000, 3000, 4000, 6000, 8000, 10,000 and 12,000. Each capacity can be furnished in three frame lengths, for short, medium or long bodies and platforms.

To the discriminating buyer, who investigates and knows for himself, the GMC becomes the one truck against which all others must be compared. It is the greatest advar-- of recent years and sets a new high mark for reliability, simplicity and efficien

ELECTRIC DIVISION

GENERAL MOTORS TRUCK COM-

DETROIT, MICHIGAN

Branches: New York, Chicago, Boston, Philadelphia, Kansas City, Detr

Please mention the "Power Wagon" when writing to advertisers.

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NOTABLE AND EXCLUSIVE ADVANTAGES FOUND IN THE

GMC ELECTRIC

Platforms or "Load Spaces" to "Fit Your Service"

Three standard chasses—short, medium and long—for each of the eight sizes or load capacities, from ½ ton up to 6 tons.

A Reduction in the Garage Care and Labor

Practically a non-adjustable machine. Working parts genuinely accessible. A "straight-line" design, capable of being understood by the owner, driver and caretaker alike.

A Correct Distribution of Weights

In average work 25 to 40% of the "live" load, body, battery and chassis weight is carried by the front tires, and 75 to 60% is carried by the rear tires, on the heavy and light chasses respectively. The right tires, neither large nor small, for the weights handled at the rated speeds are therefore applied for minimum costs in operation.

The Maximum Road Clearance

Wheel diameters largely limit the road clearances. Any part or construction closer the ground line than the axles lessens this clearance and more particularly when the part or construction is near or at the center of the span between the front and rear axles. Wherever the battery box is "underslung" between the axles, either the clearance is too little for snow-covered, crowned or rough roads or the mechanical or frame assembly; the strength, the appearance, or the good design, or all these, are sacrificed to get the essential clearance over the road. The GMC battery box on and above the frame does not "crowd" the battery side, nor does it "plow" the snow. There is a maximum clearance above the ground midway between the axles.

GENERAL MOTORS TRUCK COMPANY

DETROIT, MICHIGAN

Branches: New York, Chicago, Boston, Philadelphia, Kansas City, Detroit

Please mention the "Power Wagon" when writing to advertisers.

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Consistent and Symmetrical Engineering

The rubber tires are selected for the approximate and normal weights (front and rear), that are driven at the rated speeds over the average streets and roads. (The rubber tire is the one medium between the machine and the total weight handled and the ground and all tractive resistances.) Batteries are installed to give out their stored energy, commercially for the rated speed of the conveyance. Motors absorb this electricity through large conductors and speed controllers, giving out directly a rotary driving power, through the shaft and chains, to the rear wheels, positively and with the lowest losses of the initial and stored energy. The exact science of Electricity can readily account for the absolute consumption of current under any and all structural and road conditions—the GMC Electric shows a gain in simplicity and a balance in design.

Low Insurance; Also Favorable Legislation

Loading and transferring may be carried on in your own warehouse or in your factory. Any convenient spaces may be used for storage, charging and caretaking without affecting the insurance risks. There are no special regulations against electric garages and the electric is not excluded on piers, ferries nor at terminals and stations.

Clean, Odorless and "No Smoking"

A general oiling is required only two or three times a year, consuming a gallon or so of oil and grease. A minor routine oiling, to prevent rusting, is given a few small running parts more frequently. The oil consumption is too slight to endanger the driver's trim appearance. The driver does not hint the mechanic. No damage to delicate products by gases or scents with the GMC Electric.

A Limited Running Speed

No "racing" home, thus lessening the accident risk and assuring uniform costs in upkeep. Excessive or higher running speeds in traffic cost more to maintain than can be earned in nearly all cases, wherever the cost is analyzed.

The Definite Limitation of the Annual Costs for All Chassis Parts, Tires and the Battery in a Normal and Intended Service

The simplicity of design, the few working parts, the practical knowledge of the wear and tear, combined with the representation of w can be done with each GMC Chassis, defines in advance an accurate e mate of its earning power.

GENERAL MOTORS TRUCK COM-

DETROIT, MICHIGAN

Branches: New York, Chicago, Boston, Philadelphia, Kansas City, De

Please mention the "Power Wagon" when writing to advertisers.

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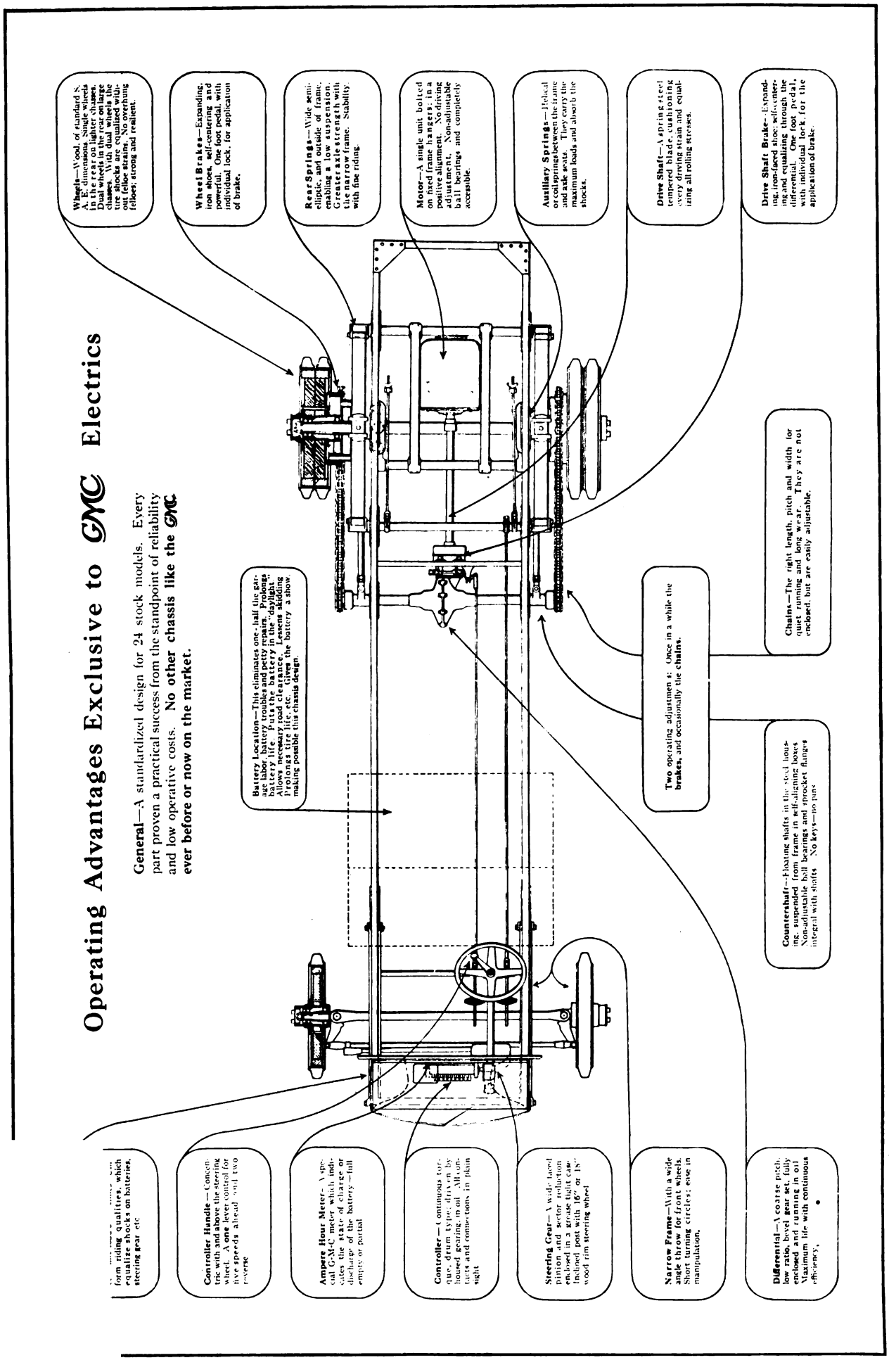
Operating Advantages Exclusive to GMC Electrics
General—A standardized design for 24 stock models. Every part proven a practical success from the standpoint of reliability and low operative costs. No other chassis like the GMC ever before or now on the market.
Wheels—Wood, of standard S. A. E. dimensions. Single wheels in the rear on lighter chassies. Dual wheels in the rear on heavier chassies. With dual wheels tire shocks are equalized without felloe strains. No overhung felloes; strong and resilient.
Wheel Brakes—Expanding, internal, self-centering and powerful. One foot pedal with individual lock, for application of brake.
Rear Springs—Wide semi-elliptic, and outside of frame, enabling a low suspension. Greater axle strength with the frame. Stability with fine riding.
Motor—A single unit bolted on fixed frame hangers; in a positive alignment. No driving adjustment. Non-adjustable ball bearings and completely accessible.
Auxiliary Springs—Helical or coil springs between the frame and axle seats. They carry the maximum loads and absorb the shocks.
Drive Shaft—A spring steel tempered blade, cushioning every driving strain and equalizing all rolling stresses.
Drive Shaft Brake—Expanding, iron-faced shoe self-centering and equalizing through the differential. One foot pedal, with individual lock for the application of brake.
Battery Location—This eliminates one-half the garage labor, battery troubles and petty repairs. Prolongs battery life. Puts the battery in the "daylight." Allows necessary road clearance. Lessens skidding tendency. Affords ease in changing the battery a show-making possible this chassis design.
Two operating adjustments: Once in a while the brakes, and occasionally the chains.
Chains—The right length, pitch and width for quiet running and long wear. They are not enclosed, but are easily adjustable.
Countershaft—Floating shafts in the steel housing, suspended from frame in self-aligning boxes. Non-adjustable ball bearings and sprocket flanges integral with shafts. No keys—no play.
form riding qualities, which equalize shocks on batteries, steering gear etc.
Controller Handle—Concentric with and above the steering wheel. A one lever control for five speeds ahead and two reverse.
Ampere Hour Meter—A special G-M-C meter which indicates the state of charge or discharge of the battery—full empty or partial.
Controller—Continuous torque, drum type; driven by housed gearing in oil. All contacts and connections in plain sight.
Steering Gear—A wide bevel pinion and sector reduction enclosed in a grease tight case. Inclined post with 16" or 18" wood rim steering wheel.
Narrow Frame—With a wide angle throw for front wheels. Short turning circles; ease in manipulation.
Differential—A coarse pitch, low ratio, bevel gear set, fully enclosed and running in oil. Maximum life with continuous efficiency.

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Some Electric Truck Facts for Progressive Business Men

AN ADVERTISEMENT BY THE

General Vehicle Company

The World's Largest Manufacturers of Electric Commercial Vehicles.

This buying motor trucks is a big proposition.

You probably hesitate to indicate even an interest in the matter just yet, but down in your heart you know you *are* interested—keenly interested.

Your horse sense tells you that excessive costs either in producing or selling reduce profits.

Also that horse drawn vehicle service at its best has its shortcomings—has limitations that seriously affect dividends.

Then why not take the first plunge by making a few inquiries?

Is it a case of losing your nerve at the prospect before you of being "hounded" by salesmen with conflicting claims—going through all the weary routine which this implies and finally sifting the evidence and letting this same horse sense decide the question of *which truck?*

Really, Mr. Buyer, this isn't necessary.

Read this advertisement through carefully and you will have decided one of the most vexing questions before you—"Shall I buy an electric truck or a gasolene truck?"

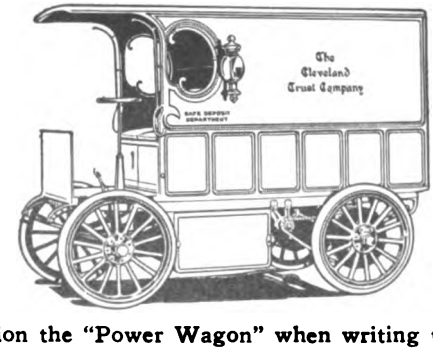
At first blush a "cheeky" assumption on our part, but wait—

Weigh the evidence.

Electric trucks—at least G. V. Electric trucks—can most economically care for 85% of all average city trucking and deliveries.

We concede the superiority of the gasolene truck for long hauls where great speed is required—that is its field just as the city is the field of the electric.

The bulk of *your* work demands concentrated city service, does it not?



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Then electric trucks, and preferably G. V. Electric trucks—are what you should buy.

Some of our competitors will dispute the foregoing division of territory between the gasolene and the electric, but it is inevitable. It is recognized already.

No?

Then answer this: Why are the great gasolene truck manufacturers preparing also to build *electric* trucks?

Because they see the writing on the wall. Because they now admit among themselves that of the two types it is the gasolene and NOT the electric which has economic limitations for concentrated city service—the service which involves 85% of all transfers and deliveries.

Have we made this point clear to you?

The modern electric truck is a simplified street car without trackage limitations.

The G. V. Electric is simple in design, has few motive parts—*all rotating*—and is simple in control, thus easy to operate.

Here is the driving mechanism—Motor, Morse Chain, countershaft and roller chains.

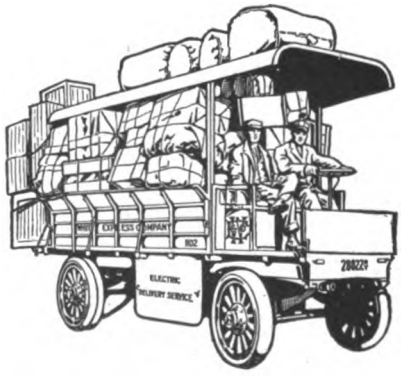
There is only *one* motor—no reciprocating parts—no cylinder, carburetor, ignition, magneto, or clutch troubles, because the G. V. has none of these trouble makers in its system.

Again, all six G. V. models are standardized, and all parts of each model are interchangeable and readily accessible.

With the fewest parts, rightly designed, made from the right materials and put together by experts, is it surprising that the G. V. has *the lowest maintenance of any power vehicle?*

We have been building Electric trucks and wagons since 1901.

We know what our vehicles can do.



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GENERAL VEHICLE GREATEST VALUE

We have more electric motor trucks in service today than all other makes of commercial electrics combined.

Nearly 1000 in New York City alone.

Over $1,000,000.00 worth in brewery transportation service.

Over 200 in department store service.

About $300,000 worth in the service of the big packers.

Over 290 used by electric light companies.

Scores in the service of the U. S. Government, and among these 19 in the Philippines.

In fact, G. V. Electrics are represented in over 100 classes of trade and the list grows daily.

Study the next paragraph.

G. V. Electrics are the *only* electric trucks made in precisely similar standardized models of six capacities—750 lbs., 1000 lbs., 2000 lbs., 2 tons, 3½ tons and 5 tons.

They are the only motor trucks made which combine, to the same extent, fundamentally superior design with high grade materials and unsurpassed workmanship. To sum up, we figure depreciation on our trucks at 10% per annum and build them accordingly.

Are you looking for truck quality?

Why not call your stenographer right now and dictate an inquiry that will bring you more G. V. facts and figures? *Get posted*, whether you are ready to buy or not!

Catalogue 91 and full data on request.

General Vehicle Company

LONG ISLAND CITY, N. Y.

NEW YORK 505 Fifth Ave. | BOSTON 84 State Street | PHILADELPHIA Witherspoon Bldg. | CHICAGO The Rookery | ST. LOUIS Wainwright Bldg.

Please mention the "Power Wagon" when writing to advertisers.

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Electric Service Supply

Practically the entire State and surrounding territory is covered by electric supply mains so that charging facilities can be arranged for any point.

The Commonweath Edison Company furnishes electricity for battery charging at its extremely favorable rates so that the cost of electric power for operating vehicles is very low, whereas the cost for practically every other commodity has been greatly increased during the past few years.

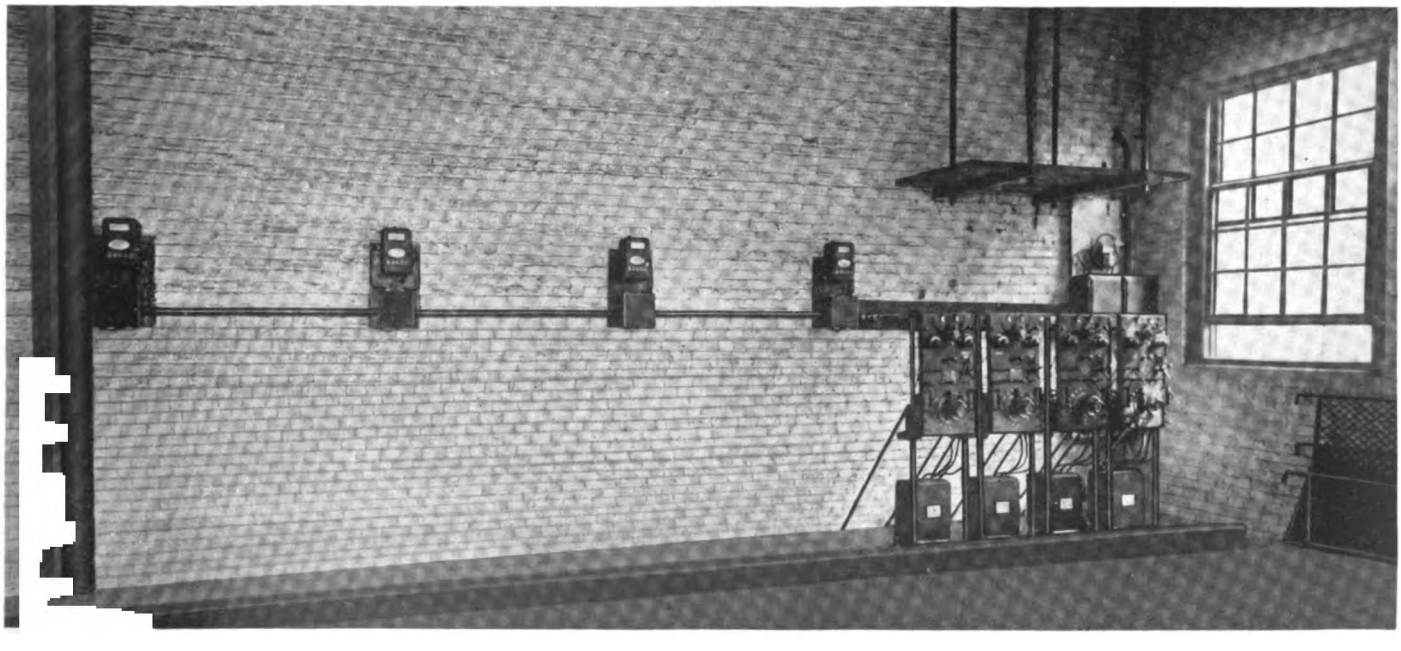
Growth and Possibilities of Electric Wagons

The advantages derived from the use of electricity in all lines are marked. The advance of the street car for instance, has been abnormal—and for one reason—it has done the work required in the most satisfactory way; with less breakdowns, less trouble and higher efficiency than can be secured with any other type of vehicle.

The facts that insurance rates are not affected by electric vehicles as they are by gasoline vehicles is an important point in favor of the former. The economy, efficiency, cleanliness, smooth running and simplicity of the electric automobile is being recognized more and more as its growing use bears witness. The simplicity of all types of electrical apparatus is its most vital point. On this ground alone even without its other advantages it would be a thing worthy of wide acceptance. The simplicity of the electric vehicle and electric truck of every sort is the one point that is most appreciated by users. There is only one lever by which all speeds may be secured. It does away with gear changes and complications to the driver. Any person who can manage a horse and wagon can be taught to use an electric and obtain good results. The total cost of operation is found to be much less than where more complicated machinery is used.

Much is being done in the development of every branch of the electrical industry and the electrical vehicle is improving with the other developments. Improvements have been made in the case of electric batteries, and work is constantly being done in this and other lines. The mechanical equipment of the automobile is also being improved so that vehicles render the user better service.

A reference to the map on the following pages will enable you to see at a glance the garage facilities of Chicago. The interior of one of the charging stations supplied with Commonwealth Edison current is shown below. In this photograph the separate charging plug and meter for each vehicle may be seen.



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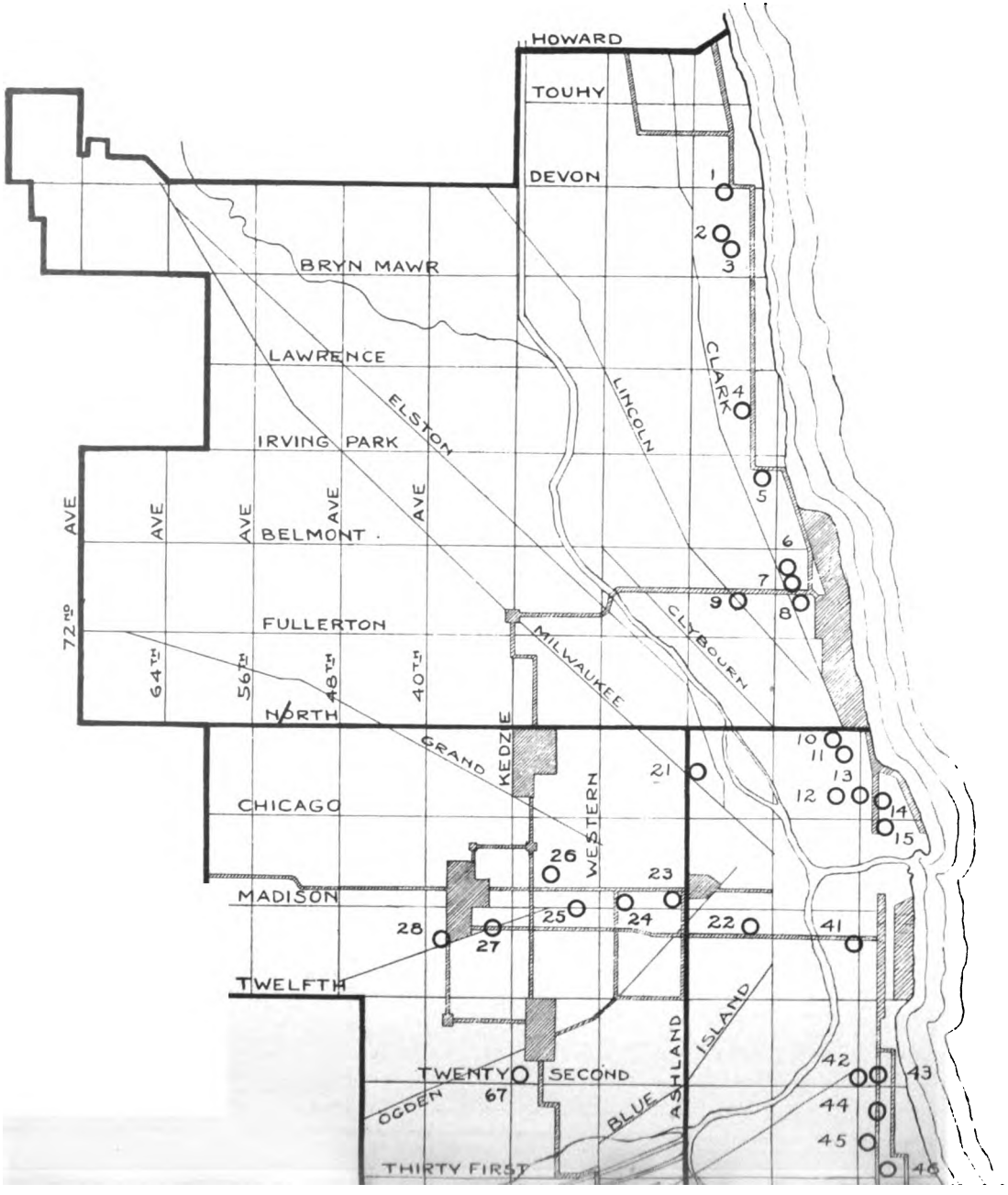

MAP OF

CHICAGO

SHOWING CHARGING STATIONS SERVED BY THE

COMMONWEALTH EDISON COMPANY

1	Wolf-Peterson Auto & Machine Shop	1129 Devon Ave.
2	Thorndale Garage	5925 Evanston Ave.
3	Commonwealth Edison Sub-station	1128 Ardmore Ave.
4	Terminal Garage	4466 Evanston Ave.
5	Rambler Garage	918 Sheridan Road
6	The Lessing Garage	2864 Evanston Ave.
7	Lake View Auto Co.	2856 Evanston Ave.
8	Lincoln Park Auto Station	2734 Hampden Court
9	Commonwealth Edison Sub-station	2745 Lincoln Ave.
10	Germania Garage	118 Germania Place
11	North Shore Garage	1452 N. Clark St.
12	Commonwealth Edison Sub-station	949 N. Clark St.
13	Lake Shore Auto Station	939 N. State St.
14	Boulevard Auto Garage	870 Lincoln Park Blvd.
15	N. Division Auto Garage	160 Superior St.
21	Commonwealth Edison Sub-station	1510 W. Division St.
22	Commonwealth Edison Co. Auto Barn,	211 S. Morgan St.
23	Ashland Auto Garage	14 N. Ashland Blvd.
24	Madison Street Garage	2215 W. Madison St.
25	Commonwealth Edison Sub-station	2543 Madison St.
26	Rowe Auto Station	2815 W. Lake St.
27	The Homan Garage	3355 Colorado Ave.
28	Garfield Park Auto Garage	612 Douglas Blvd.
41	Chicago Auto Club (for members only)	19-21 Plymouth Pl.
42	Commonwealth Edison Sub-station	19 E. 21st St.
43	Studebaker Bros. Mfg. Co.	21st St. & Michigan Ave.
44	Anderson Carriage Co.	2416 Michigan Ave.
45	Commonwealth Edison Sub-station	2640 Wabash Ave.

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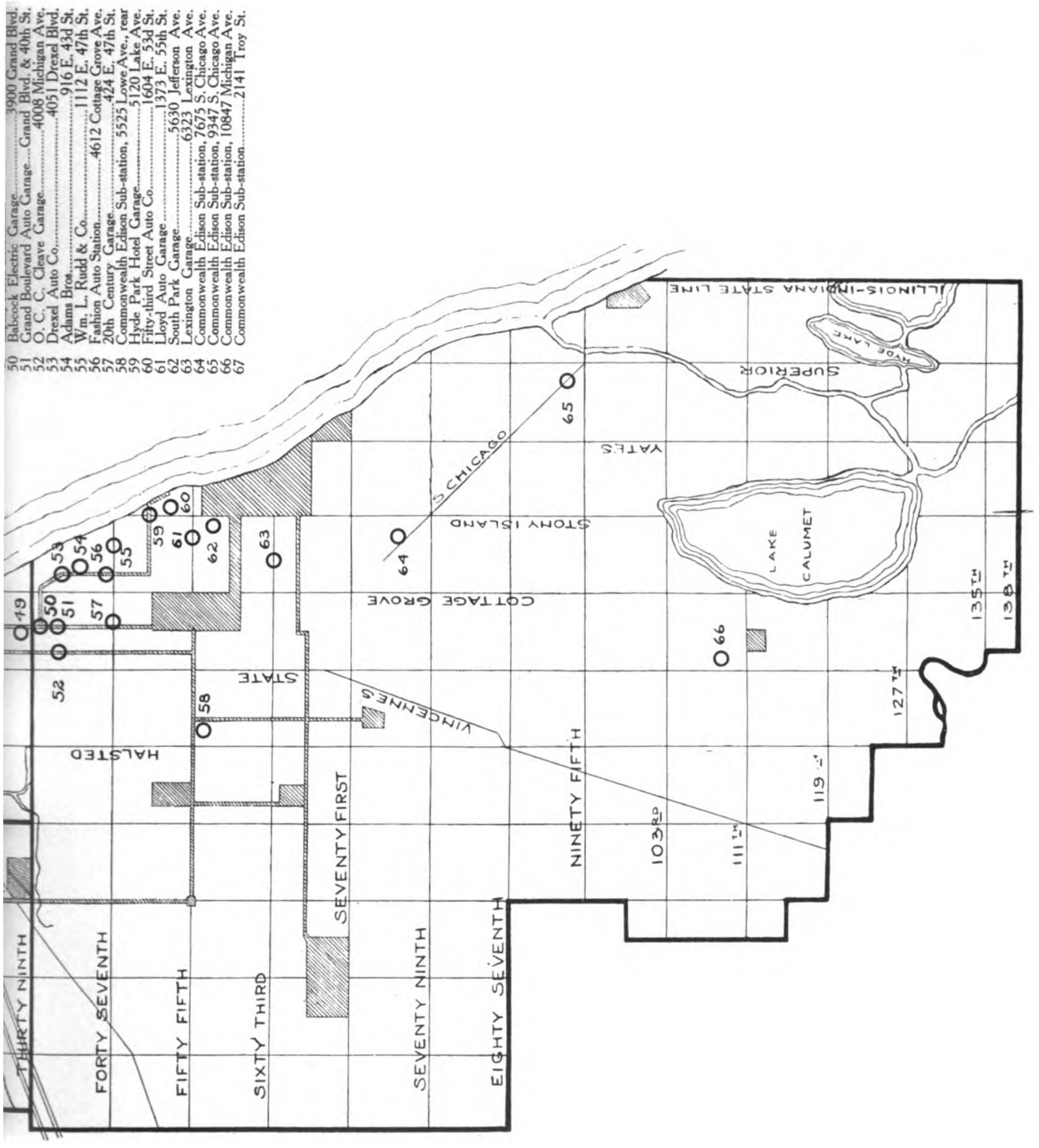

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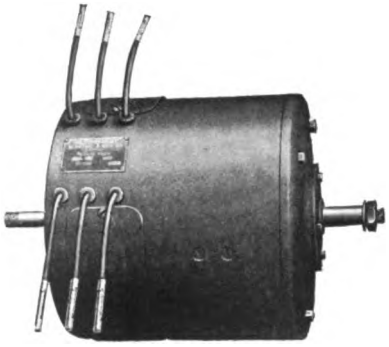

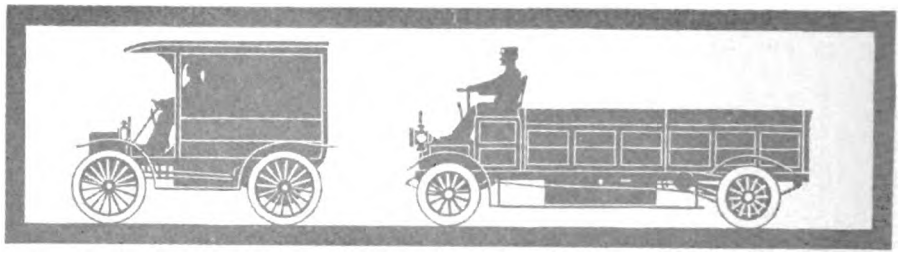

Electric Trucks Built For Quality Are Equipped With Westinghouse Motors

Atterbury Motor Car Co., Buffalo, N. Y.
Dunkirk Elec. & Mfg. Co., Dunkirk, N. Y.
Washington Motor Vehicle Co., Washington, D. C.
Walker Vehicle Co., Chicago, Ill.
Studebaker Corporation, South Bend, Ind.
Joliet Auto Truck Co., Joliet, Ill.
H. McFarlane & Co., Cedar Rapids, Iowa
Cleveland Motor Truck Co., Cleveland, O.
Bryce Baking Co., Indianapolis, Ind.
Argo Elec. Vehicle Co., Saginaw, Mich.
Hupp-Yates Elec. Car Co., Detroit, Mich.
Ward Motor Vehicle Co., New York, N. Y.
H. H. Babcock Co., Watertown, N. Y.
Merriman & Pepper Elec. Vehicle Co., Detroit, Mich.
Lansing Wheelbarrow Co., Lansing, Mich.
Battendorf Axle Co., Battendorf, Ia.
Chas. K. Davis, Detroit, Mich.
Continental Motor Truck Co., Denver, Col.
Eubank Power & Trans. Co., Portland, O.
T. C. Jenkins Co., Pittsburgh, Pa.
Champion Wagon Co., Oswego, N. Y.

The heart of the electric vehicle is the **motor.** If the motor quits, so does the car.

Any truck at the auto shows, equipped with the **Westinghouse Motor,** is worth your fullest examination.

When a truck builder makes the Westinghouse motor a part of his equipment he does it because in no other way can he get the benefit of the special engineering experience of which the Westinghouse motor is the result.

If he takes as great pains to get the best obtainable material and design in the balance of his product, you can't go wrong in buying his truck.

The Westinghouse Vehicle Motor is an evolution. All the experience of the Westinghouse engineers in the designing and building of street railway motors is back of it. Thoroughly knowing the severe conditions under which electric vehicles operate—frequent starting and stopping, rapid acceleration, steep grades, snow and mud-covered streets—the Westinghouse experts offer the solution in the Westinghouse Vehicle Motor.

For rough road work no better motor could be made. It is ruggedly built without burdening the vehicle with undue weigh

Westinghouse Electric & Manufactur"

East Pittsburgh, Pa.

Sales Offices in 45 American Cities

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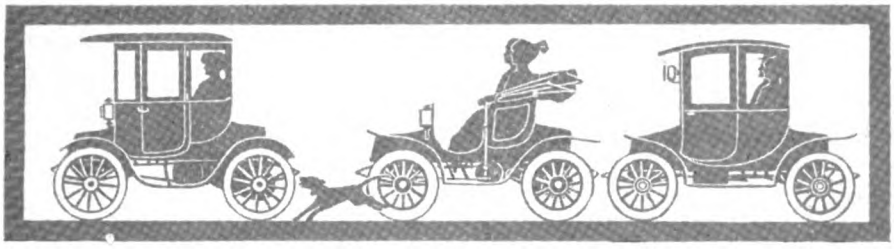

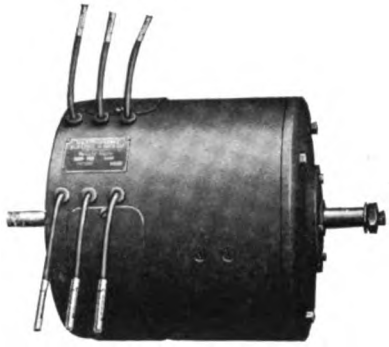

Electric Pleasure Vehicles Built For Quality Are Equipped With Westinghouse Motors

Clark Motor Car Co., Buffalo, N. Y.
Borland-Grannis Co., Chicago, Ill.
Studebaker Corporation, South Bend, Ind.
Baker Motor Vehicle Co., Cleveland, O.
Dayton Motor Co., Dayton, Ohio
Argo Elec. Vehicle Co., Saginaw, Mich.
Grinnell Electric Car Co., Jackson, Mich.
Colonial Electric Car Co., Detroit, Mich.
J. G. Phipps Elec. Car Co., Detroit, Mich.
Hupp-Yates Elec. Car Co., Detroit, Mich.
Broc Elec. Vehicle Co., Cleveland, O.
Iowa Windmill & Pump Co., Cedar Rapids, Ia.
Century Electric Motor Car Co., Detroit, Mich.

The vehicle motor section of the Westinghouse plant is practically an isolated factory specializing on vehicle motors.

Betterments are constantly sought after to the end that the Westinghouse Vehicle Motor represents the *best and latest in vehicle motors at all times.*

We will be glad to give you detailed information about the Vehicle Motor if you will write us mentioning this paper.

Things to remember about the Westinghouse Vehicle Motor are:—

Rugged Construction
Lightness in Weight
Fully protected from dust and dirt
Efficient (Increased mileage)
Quiet Running
Reliable Operation
Low Maintenance

Especially to Manufacturers: We want to help you solve your problems in the application of electric motors to trucks and pleasure vehicles. We are always ready to send a specialist to work with you on your equipment.

Westinghouse Electric & Manufacturing Co.

East Pittsburgh, Pa.

Sales Offices in 45 American Cities

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Westinghouse Motors in the Factory and Garage

To Automobile Manufacturers:

The history of the automobile industry is a history of periodic price reduction made possible by quantity output and economical manufacture. Labor is the chief item of cost. Do you know Westinghouse motors have proved to be a leading factor in cost reduction and output increase? To meet future competition you should investigate the saving to be made by letting Westinghouse motors run your machinery. Write for facts and expert advice.

To the Manager of the Garage and Repair Shop:

No GARAGE or Repair Shop is successful without UP-TO-DATE EQUIPMENT. Satisfied customers require quick repair and maintenance service. Equip your garage or shop so that your customers will feel that you are carrying on your business in the most approved way and at the smallest expense in time and effort. Do you realize that this can be accomplished by using Westinghouse small motor driven machines?

Westinghouse Small Motor Operating Portable Drill

Portable Tire Pumps run by Westinghouse Small Motors excel in convenience, and do their work well and quickly.

Portable Electric Drills are used in every branch of automobile repair where quick and neat work is essential. Think of the convenience compared with an old hand drill.

Westinghouse Buffing and Grinding Motors sharpen small tools and keep polished parts bright.

Motor driven Disc Ventilating Fans keep your garage well ventilated and free from smoke and fumes. Customers will enjoy coming in to see you.

It will pay you to investigate the uses for Westinghouse small motors in the Garage and Repair Shop. Send today for complete information to Department PW.

Westinghouse Electric & Manufacturing Co.

East Pittsburgh, Pa.

Sales Offices in 45 American Cities

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WALKER ELECTRIC
MOTOR TRUCKS

There is no longer any question but that the work of hauling and delivering can generally be done more economically, everything considered, by power-driven than by horse-drawn vehicles.

Neither is there longer any question as to the merit of the Electric Commercial Vehicle. On the contrary, it is a fact that the leading merchants in all lines, the country over, have set their seal of approval upon the Electric as being pre-eminently fitted to give them more of the things they want than any other vehicle.

THE THING THE USER WANTS. Briefly, it is the ability of his trucks or wagons to do all the the work assigned to them Economically and Continuously, day after day and year after year.

IN THESE ESSENTIALS, and in all others, WALKER ELECTRICS are successfully meeting the requirements of the most exacting users.

As this is the "Chicago Show Number" we think it fitting to reproduce on the next two pages photographs of several types of Walker Vehicles in use by leading Chicago merchants.

Walker Vehicle Company

NEW YORK 134 Church Street
CHICAGO 112 W. Adams Street
BOSTON 131 State Street

Representatives in All Principal Cities

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WALKER MOTOR

Made in Load-Capacity Size

1,500-2,000-pound Walker Standard Panel Type

4,000-pound Walker Wagon with Stake or Express Body

ABOVE ARE DIFFERENT MODELS IN USE

WALK R

NEW YORK
30 Church Street

CHICA
112 W. Ada t

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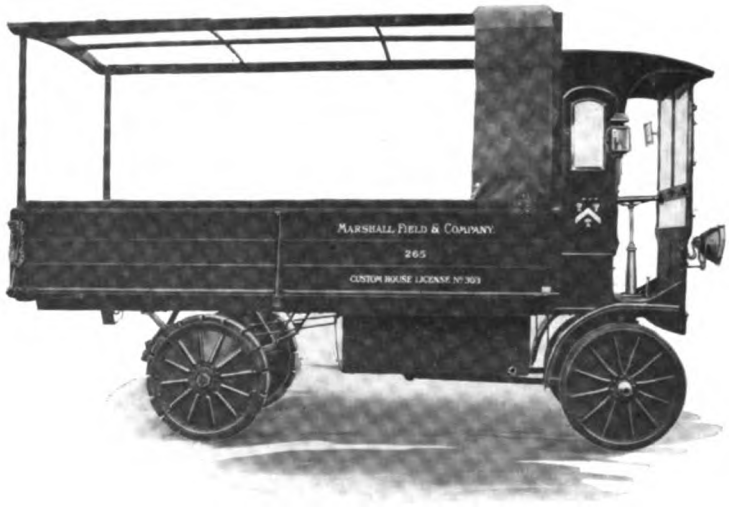
ELECTRIC TRUCKS

rom 700 to 7,000 Pounds

1,500-pound Walker Special Parcel Delivery Wagon

700-1,000-pound Walker Electric Parcel Delivery Wagon



4,000-pound Walker Electric Furniture Wagon

BY LEADING STATE ST. MERCHANTS—CHICAGO

V =HICLE CO.

1 ..STON
'ate Street

Representatives in all other principal cities

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Energy for the Electric Wagons

Operated by

Marshall Field & Company
Carson Pirie Scott & Co.
Chas. A. Stevens & Bros.
Mandel Brothers
Ward-Corby Company
Montgomery Ward & Co.
The Fair
Case & Martin Co.

and many others of the up-to-date Chicago merchants (some of whose vehicles are illustrated in the foregoing pages) is furnished by the

Commonwealth Edison Company

Edison Building 120 West Adams Street

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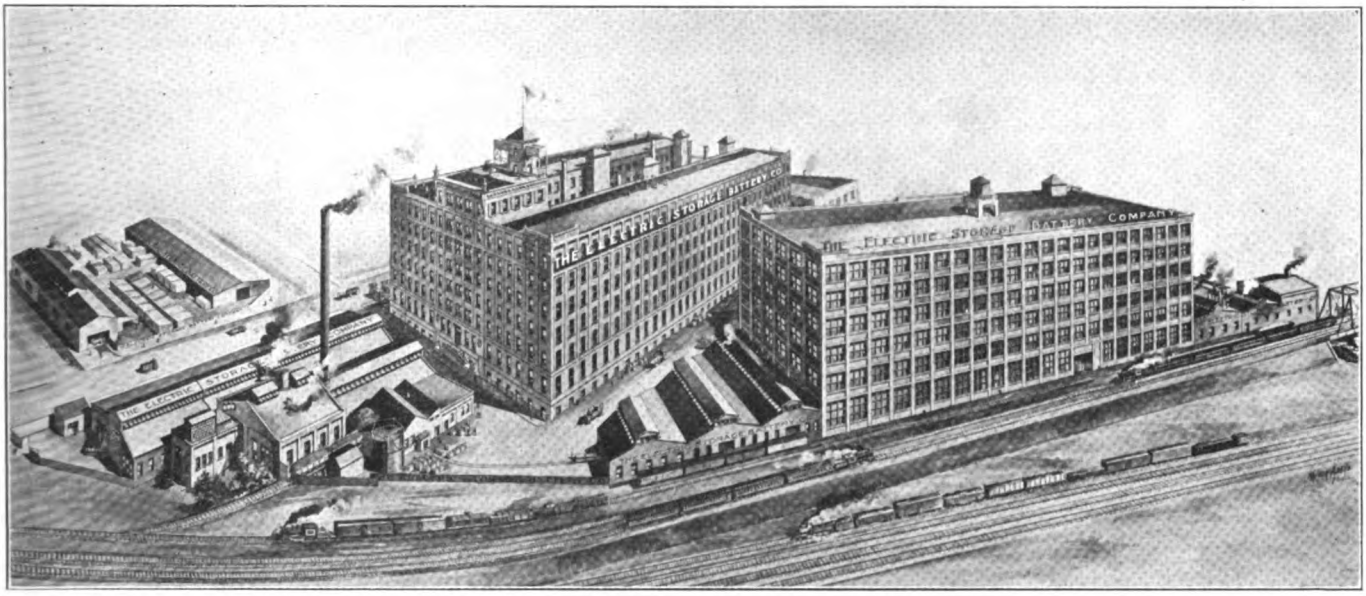
"Exide"
"Hycap=Exide"
"Ironclad=Exide"
Batteries for Electric Vehicles



Where the "Exide" Batteries are made.—The largest battery manufacturing plant in the country.

Here is the *strongest* kind of evidence that can be given of the absolute *reliability* of "Exide" batteries.

The large electric lighting and power companies of New York, Chicago, Boston, Brooklyn, Rochester, Baltimore, Spokane, Minneapolis and Kansas City have invested hundreds of thousands of dollars for "Exide" Emergency Batteries. These companies use "Exide" batteries having an aggregate capacity of 79,523 H. P. These enormous emergency batteries are in their leading essentials absolutely the same as "Exide" vehicle batteries.

The U. S. Government uses the "Exide" Battery in the submarine boats of the navy.

You cannot do better than to select for your commercial car the same type of battery which has been chosen by these experts.

ELECTRIC STORAGE BATTERY CO.

PHILADELPHIA, PA. **1912**

STON CHICAGO ST. LOUIS CLEVELAND ATLANTA DENVER DETROIT
SCO TORONTO PORTLAND, ORE. SEATTLE LOS ANGELES

...s in Philadelphia, New York, Boston, Chicago, Cleveland, St. Louis, Denver, Atlanta and San Francisco

...yide" Distributors Traveling "Exide" Inspection Corps

Use the "Exide" Sparking Battery for ignition and lighting.

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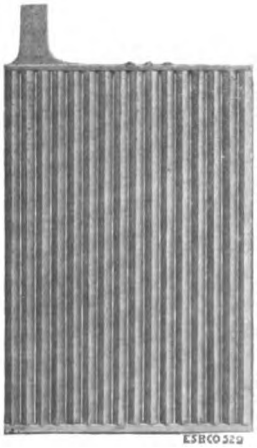


The "Ironclad-Exide" Battery

The "Ironclad-Exide" Battery is the latest and highest development in the "Exide" battery family.

The "Ironclad-Exide" Battery will run an electric car more miles with less expense, less attention and with greater continuity of service than any other battery made.

It will give satisfactory service in either cold weather or hot. It is the battery for use in either pleasure or commercial cars.

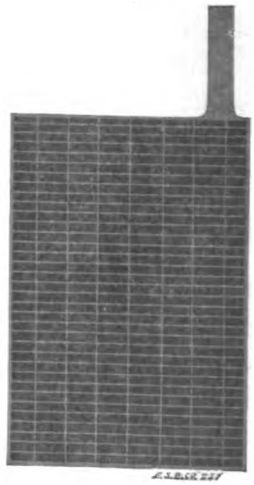
The "Ironclad-Exide" Battery will not quit on hills nor in starting heavy loads. It can be recharged at a reasonable cost.

Present vehicle users may procure the improved service obtainable from the "Ironclad-Exide" Battery, as "Ironclad-Exide" plates can be installed in any jars of standard size.

The "Ironclad-Exide" guarantee is plain and straightforward.

Write for the "Ironclad-Exide" book.

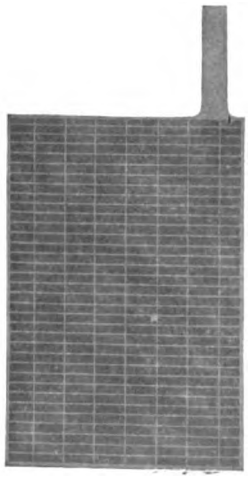
The "Exide" Battery



Ever since its introduction in 1900, the "Exide" Battery has maintained undisputed supremacy in the vehicle battery field. In fact, the enormous growth of the electric vehicle industry has been due in no small measure to the success of the "Exide" Battery.

The "Exide" Battery is designed to meet all reasonable demands of electric vehicles for both pleasure and commercial purposes. Over 90% of all electric pleasure vehicles manufactured have been equipped with this battery.

Write for the "Exide" book.



The "Hycap-Exide" Battery

The "Hycap-Exide" Battery is furnished to meet the demands of vehicle owners who desire a battery which will give greater mileage per charge than the "Exide". Its design is similar to the "Exide", but the plates are thinner and a larger number can be used in the same space.

This is the battery used for operating 51 street cars now running on the streets of New York City. Mr. F. W. Whitridge, Receiver for the Third Avenue R. R. Co. of New York City, under date of Dec. 29, 1911, writes as follows:

"I have had in operation upon one of the lines under my jurisdiction, on one of my storage battery cars, a battery consisting of 58 cells of Type MV 29 "Hycap-Exide" manufactured by you. This battery went into service on September 1st, 1910, and up to December 1st, 1911, has made 20,302 miles. It is still in excellent condition, giving full mileage and has had no plate renewals or repairs of any kind."

The battery that will operate street cars will surely run your commercial "Electric."

THE ELECTRIC STORAGE BATTERY Co.

1888 PHILADELPHIA, PA.

NEW YORK BOSTON CHICAGO ST. LOUIS CLEVELAND ATLANTA DEN[illegible]
SAN FRANCISCO TORONTO PORTLAND, ORE. SEATTLE [illegible]

"Exide" Depots in Philadelphia, New York, Boston, Chicago, Cleveland, St. Louis, Denver, Atl[illegible]
812 "Exide" Distributors Traveling "Exide[illegible]

Use the "Exide" Sparking Battery for ignition and lighting

Please mention the "Power Wagon" when writing to advertisers.

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"Exide" and "Ironclad-Exide" Batteries IN COMMERCIAL VEHICLE SERVICE

Some of the Prominent Users:

American Express Company	81 Equipments	Rochester Ry. & Light Co., Rochester N. Y.	10 Equipments
Gimbel Bros., New York City	75 "	U. S. Post Office Service, St. Louis	10 "
Annheuser-Busch, New York City	60 "	Union Electric Lt. & Pwr. Co., St. Louis	10 "
H. C & A. I. Piercy, New York City	31 "	Halle Bros., Cleveland, Ohio	8 "
Philadelphia Electric Co.	33 "	F. A. Poth & Sons, Philadelphia	8 "
Woodward-Lothrop, Inc., Washington, D. C.	20 "	C. Schmidt & Sons, Philadelphia	9 "
Jacob Ruppert Brewing Co., New York City	14 "	United Gas Improvement Co., Philadelphia	8 "
Louis Bergdoll Brewing Co., Philadelphia	14 "	U. S. Navy Yard, Washington, D. C.	9 "
Jas. A. Hearn & Sons, New York City	15 "	Tenney Syndicate, Boston	9 "
Gorham Co., New York City	13 "	Edison Illuminating Co., Detroit	8 "
Commonwealth Edison Co., Chicago	12 "	Geo. Wiedemann Brewing Co., New York City	5 "
R. H. Macy & Co., New York City	10 "	Cleveland Electric Illuminating Co., Cleveland	5 "
Gambrinus Brewing Co.	10 "	Marshall Field, Chicago	5 "
B. Altman & Co., New York City	12 "	Krey Packing Co., St. Louis	5 "
United States Express Co.	18 "	A. Schoenhut Co., Philadelphia	6 "

All these twenty-two prominent electric vehicle makers use either the "Ironclad-Exide", the famous "Exide" or the "Hycap-Exide" Battery. These batteries have been their standard for periods ranging up to eight years.

No other battery manufactured carries such an endorsement as this.

Argo Electric Vehicle Co.
Baker Motor Vehicle Co.
Borland-Grannis Co.
Broc Electric Vehicle Co.
Columbus Buggy Co.
Champion Wagon Co.
Commercial Truck Co. of America
Columbia Motor Car Co.
Dayton Electric Car Co.
General Vehicle Co.
Grinnell Electric Car Co.
Hupp-Corporation
Kentucky Wagon Mfg. Co.
C. P. Kimball & Co.
Ohio Electric Car Co.
Rauch & Lang Carriage Co.
Standard Electric Car Co.
Studebaker Automobile Co.
The Waverly Co.
Walker Vehicle Co.
Ward Motor Vehicle Co.
Woods Motor Vehicle Co.

THE ELECTRIC STORAGE BATTERY CO.

PHILADELPHIA, PA. 1912

YORK BOSTON CHICAGO ST. LOUIS CLEVELAND ATLANTA DENVER DETROIT
SAN FRANCISCO TORONTO PORTLAND, ORE. SEATTLE LOS ANGELES

Depots in Philadelphia, New York, Boston, Chicago, Cleveland, St. Louis, Denver, Atlanta and San Francisco

"Exide" Distributors Traveling "Exide" Inspection Corps

Use the "Exide" Sparking Battery for ignition and lighting.

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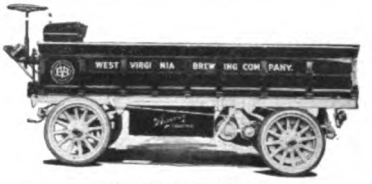
Silent WAVERLEY Electrics

Model 83—Shaft-Driven Delivery Wagon for Retail Business

Waverley 3-Ton Truck



Waverley 3-Ton Truck

Why Waverley Commercial Cars Are Multiplying

THERE is a Waverley Electric Car for every business purpose. In every line where Waverleys are used they have proved the most economical means of haulage. This is why the Waverley cars are continually multiplying on the city streets.

The Shaft-Driven Delivery Wagon for retail houses—the one, two and three ton Trucks for heavy hauling—the Waverley Ambulance for hospitals and dispensaries—the Waverley Electric Hearse, the most elegant of all hearses.

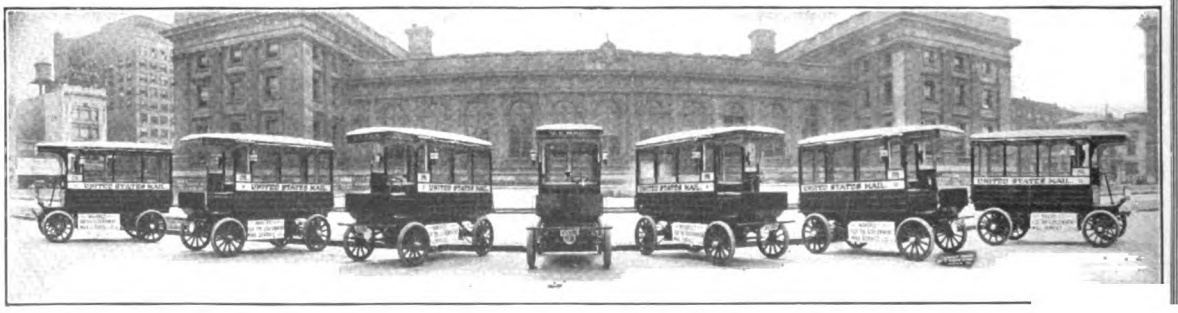
Years of comparison in actual service show the Waverley to be unsurpassed in efficiency, and unequaled in dependability for commercial use. Records and figures amply back these statements. Every man who has a problem of hauling expense is invited to write us for definite information applied to his business.

The Waverley maintenance contract protects every purchaser. We figure the limit of costs for tires, battery renewals and parts, covering a stated period of years. The Waverley Agent is prepared to give a guaranty against excess of that limit.

Write today for illustrated catalog and full particulars.

THE WAVERLEY COMPANY, 213 S. East Street, Indianapolis, Ind.

AGENTS IN PRINCIPAL CITIES



This illustration shows Waverley Electric Trucks which are being put into the U. S. Mail Service at St. Louis. Rigid gov inspection was made of each one of these cars while it was in progress of construction. Part by part, each car had to come up Government standard. Each one of the cars specified in the contract amply fulfilled the Government's requirements. Yet was not one "special" item in their construction. These cars are just the same in mechanical and electrical principle— rial—in workmanship—as every Waverley Truck that leaves the factory.

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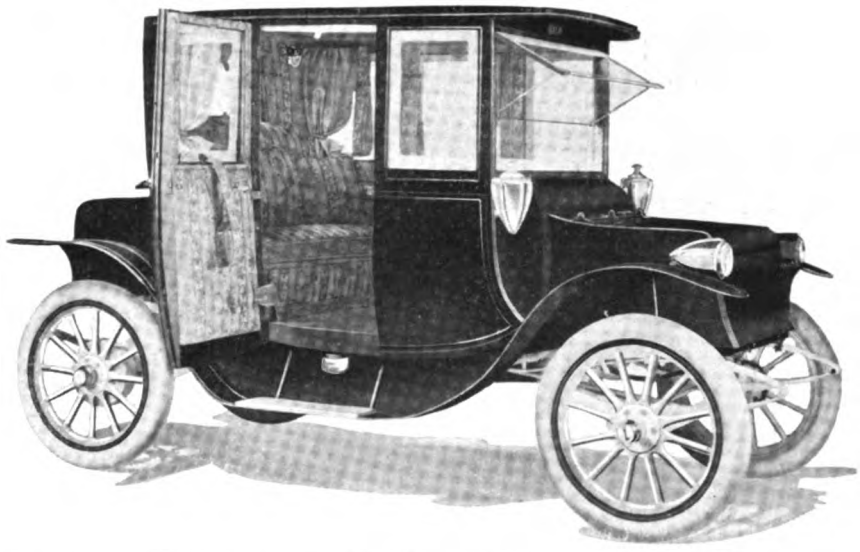
Silent WAVERLEY Electrics



Limousine-Five ----The Biggest Success of Ten Years in Electrics

Note that Others Are Following Limousine-Five in the Large Car Idea

Not since the Silent Waverley made the Shaft Drive the popular drive, has there been such a remarkable advance in electrics as our Limousine-Five.

Although it has been only a few months since Limousine Five was announced, it has been received with enthusiasm equaling our highest expectations.

The market was waiting for Silent Waverley Limousine-Five. The Electric Limousine with full view ahead. It is going with a whirl!

Sixty-five inches is the length of interior of body of Silent Waverley Four-Passenger Brougham for 1912. To afford this interior all the dimensions have been increased over those of 1911. The 1912 model is 9 inches longer over all. The wheelbase is inches longer. The interior length is 6½ inches eater. The front seat is 2½ inches wider. The ent Waverley four-passenger cars have full width, ply upholstered seats in front as well as rear.

All this means more room—more comfort—more luxury—of cloth or leather upholstery—bigger windows.

It is the *perfection* of our four-passenger models from the standpoints of mechanical and electrical construction and artistic design that has made possible the step forward to our Limousine Five.

TEN SILENT WAVERLEY MODELS for 1912 give the Waverley Agent a range to meet any demand at any price from $3,500 down to $1,225.

Special attention is called to Waverley Sheltered Roadster with folding Landau top, built on the lines of the latest gasoline roadster designs. This car is the same in mechanical and electric equipment as that which entered an endurance run of gas cars last July and made a tour of almost 1,400 miles with actual running time of 124 hours.

With actual running time of 124 hours—an average of 113 miles a day and with the longest single run of 157 miles in one day.

THE WAVERLEY COMPANY, 213 So. East St., Indianapolis, Ind.

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Opinions of Satisfied Users of Electric Motor Wagons

These are in addition to those of Chicago merchants, expressed on other pages of this advertisement of the Commonwealth Edison Company.

Replaces 3 horses with a 1-ton Electric and makes better time.

APMANN & MEYER, Brooklyn, N. Y.—This concern averages from 35 to 50 miles a day with its 1 ton electric bakery wagon, on one charge of the battery, and has done as high as 62 miles on a single charge. The cost for current averages $12 a month, charging being done through a General Electric mercury arc rectifier. John Meyer, proprietor of this concern, says: "I have so far had no breakages or replacements, and one of my former horse drivers operates the wagon. I am doing the work of three horses with this wagon in less time than the three horses were able to do it."

3½-ton Electric displaces 2 double wagons and shows yearly saving of $1,300.

NEW YORK TRANSFER CO., N. Y. City.—The total cost, between August 15, 1909, and September 1, 1910, of operating this concern's 3½ ton electric wagon (including insurance, repairs, new tires, new batteries, wages of driver and helper) was $3,353.85. The cost of operating two double wagons (similar to those which the electric wagon displaced) during the same period, was $4,694.60, showing a saving in favor of the electric wagon of $1,340.75.

Reorder for second Electric wagon on account of good performance of first.

DUFF & REPP FURNITURE CO., Kansas City, Mo.—This company advises a well known maker of electric motor wagons as follows: "We take pleasure in handing you herewith our order for another 2 ton electric truck, to be a duplicate of the one ordered by us last year. We are making 26 to 30 miles a day over the hills of our city with the machine, replacing five horses, and this order for a second machine is in consequence of the work done, and our belief in the economy of our method of hauling."

Make 1,490 miles, averaging 45 miles per day, without a mishap.

PATTERSON TRANSFER CO., Memphis, Tenn.—During 33 days, from June 19 to July 22, 1911, inclusive, this concern's 1 ton electric wagon made a total of 1,490 miles. The company states: "While the average per day was 45 miles, at times when it was necessary, we made as high as 65 miles in a single day. In making this mileage, we made 950 stops, all without a mishap of any kind."

Will never go back to the use of horses.

KIRKHOFF BROS. & CO., Indianapolis, Ind.—This company was so well satisfied with its electric wagon, that after five months' use its manager wrote the manufacturer as follows: "Taking into consideration the convenience, saving of time and economical running expenses, as compared with horse-drawn vehicles, we are glad to have made the change and never will go back to the use of horses in our business."

A reorder after seven years' experience.

THE CLEVELAND TRUST CO., Cleveland, O.—In writing his approval of the electric wagon, the treasurer of this company says: "It would seem that there is nothing better we can say, than to recall to your mind the fact that we purchased our second machine after some six or seven years' experience with the old truck."

The Electric wagon the solution of the city delivery problem.

SHANE BROS. & WILSON CO., Philadelphia, Pa.—Writing of the performance of the 3½ and 5 ton electric power wagons in his company's service, George C. Shane says: "We believe the electric trucks to be the solution of the city delivery problems. Should we increase our truck equipment for this kind of work we would of course put in more electric

These are but a few out of thousands of users of elec[illegible]r wagons, who are more than satisfied with the perfo[illegible]f their machines. Are you up-to-date?

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Fifty Concerns in This Country Own and Operate

1921 Electric Motor Wagons

OR AN AVERAGE OF OVER 38 EACH

One Single Concern Owns 250 Electrics, Another 230, and a Third 100

ALTOGETHER, there are **7,000 Electric Motor Wagons** used daily in the United States.

These large individual owners show by their actions that they have the

UTMOST CONFIDENCE in the ELECTRIC MOTOR WAGON

One single company would not have invested nearly **three-quarters of a million dollars** in Electric Wagons unless they had been **absolutely certain** that the **Electric Wagon is the best.**

Large Fleets of Electric Wagons

OWNERS	Number of Machines
Adams Express Co.	250
Ward Bread Co., New York City	230
New York Edison Co., New York City	100
American Express Co.	86
Gimbel Brothers, New York City	76
Jacob Ruppert, New York City	72
George Ehret, New York City	63
Peter Doelger Brewing Co., New York City	57
Ward-Corby Co., Chicago	56
United States Government	52
Anheuser-Busch Brewing Co., St. Louis, Mo.	50
United States Express Co.	50
C[illegible]mmonwealth Edison Co., Chicago	44
E[illegible]ton Edison Co., Boston, Mass.	39
E[illegible] Poth & Son, Philadelphia, Pa.	38
E[illegible] Macy & Co., New York City	37
E[illegible] & A. I. Piercy Co., New York City	35
I[illegible]endent Messenger & Delivery Service Co., Roches-ter, N. Y.	28
E[illegible]lesby & Co., Chicago, Ill.	25
E[illegible]lerick Loeser & Co., Brooklyn, N. Y.	25
C[illegible]son, Pirie, Scott & Co., Chicago, Ill.	25
N[illegible]or Delivery Co. (Postal Service, N. Y. City)	24
F[illegible]B. Chaflin Co., N. Y. City (and allied companies)	23
A[illegible]aham & Str[illegible]s, Brooklyn, N. Y.	20
C[illegible] New York City	20
Philadelphia Electric Co., Philadelphia, Pa.	20
C. Schmidt Brewing Co., Philadelphia, Pa.	20
St. Paul Bread Co., St. Paul, Minn.	20
United Dressed Beef Co., New York City	20
United Gas Improvement Co., Philadelphia, Pa.	20
Ward-Corby Co., Boston, Mass.	20
Marshall Field & Co., Chicago, Ill.	20
Tiffany & Co., New York City	19
B. Altman & Co., New York City	18
Consolidated Gas, Electric Light & Power Co., Baltimore, Md.	16
Union Electric Light & Power Co., St. Louis, Mo.	16
Woodward & Lothrop, Washington, D. C.	16
L. Bergdoll Brewing Co., Philadelphia, Pa.	15
Chapin & Sacks Mfg. Co., Washington, D. C.	15
V. Lowres, Gambrinus Brewing Co., Philadelphia, Pa.	15
N. Y. Butchers' Dressed Meat Co., New York City	15
Rochester Railway & Light Co., Rochester, N. Y.	15
Simpson-Crawford Co., New York City	15
Sulzberger Sons Co., New York City	15
Gorham Company, New York City	14
Ward-Corby Co., Providence, R. I.	12
William H. Block Co., Indianapolis, Ind.	10
Case & Martin, Chicago, Ill.	10
Halle Bros., Cleveland, Ohio	10
St. Louis Postal Service, St. Louis, Mo.	10

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The Superiority of Electrics Over Horses

has been forcibly demonstrated during the past few weeks of severe weather by many actual instances

The photograph and clipping below speak for themselves.

FORTY HORSES KILLED DAILY
Icy Pavements Fatal to Many Draft Animals.
1,000 SLIP DOWN EACH DAY.
Some Deaths Could Be Prevented by Using Blankets.
According to the checking list of George A. H. Scott, superintendent of the Illinois Humane society, 1,000 horses fall on the icy streets daily in this zero weather, and 4 per cent, or forty horses, die in consequence

"According to the checking list of George A. H. Scott, Superintendent of the Illinois Humane Society, 1,000 horses fell on the icy streets daily in the zero weather and 4 per cent, or 40 horses, die in consequence every day.

"Reports have been received of falls in all sections of the city, particularly at Quincy and Market Streets and at the Harrison, Kinzie and Rush street bridges.

"'There are not enough ambulances to care for the horses that fall until several hours after the reports are received, and as a result many suffer and die from the cold. If citizens would cover the horse or put a blanket under him until help arrives from the Humane Society, many horses could be saved,' said Superintendent Scott."

—*Chicago Tribune.*

Commonwealth Edison Company

Edison Building **120 West Adams Street.** **Chicago**

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The Dependable Kind –

F&S Ball Bearings

Efficiency in Ball Bearings carried to its highest point

MADE IN GERMANY MADE IN GERMANY

J. S. Bretz Company, Sole Importers

250 West Fifty-fourth Street NEW YORK

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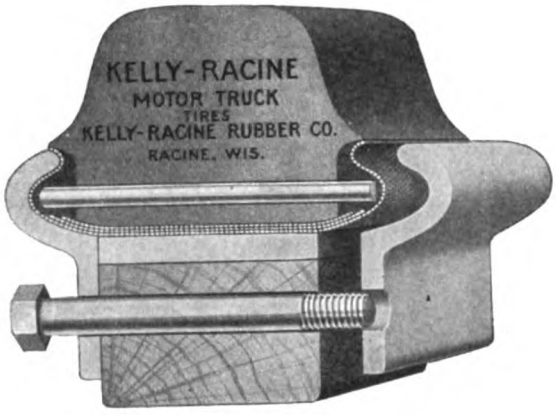
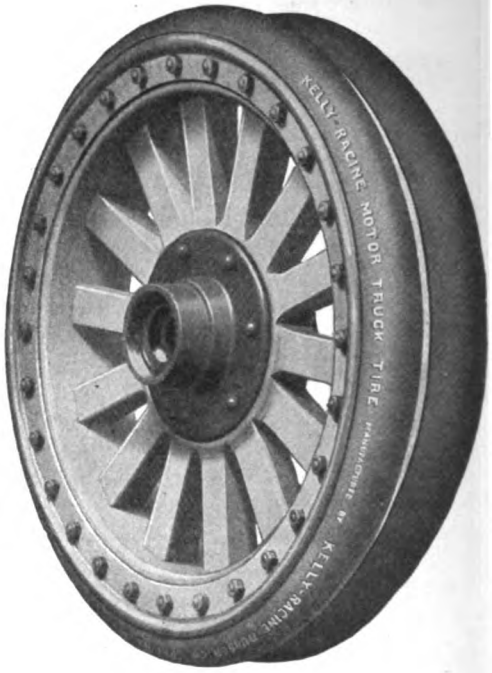


Note how the cross wires are imbedded in the "hard Rubber" Bead insuring

"Positive Security of Fastening"



Take off your Pneumatics

Apply Kelly-Krotz Tires on same rims

WRITE DEPT. "T" FOR PRICES AND FULL PARTICULARS

Kelly-Racine Rubber Co., - Racine, Wis.

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Ford

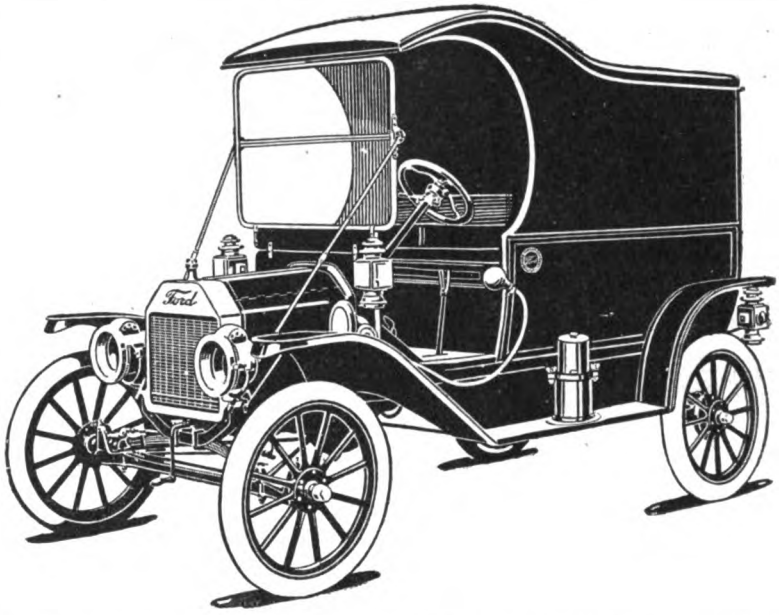
Model T Delivery Car

$700

Fully Equipped F. O. B. Detroit

This price includes full equipment —Automatic Brass Wind Shield, Speedometer, Ford Magneto built into the motor, two six-inch Gas Lamps and Generator, three Oil Lamps, Horn and Tools. No Ford Cars sold unequipped.

Capacity of this Universal Delivery Car is 750 pounds of merchandise.



¶ This Delivery Car was most thoroughly "tried out" in actual delivery service for two years before we offered it to the business world. (By the Wanamaker Stores in New York City and Philadelphia, by the Bell Telephone Company all over the country, and by others.)

¶ We made sure of the dependability of this car in delivery service. We made sure of the economy of this car in actual use. We recommend it in all respects.

¶ The capacity—750 pounds of merchandise—meets the demand of all retail lines—department stores—wholesalers and jobbers—Telephone and Electric Light Companies, etc.

¶ Simple in operation—low in purchase price—cheap in maintenance—Vanadium steel construction (the same strong chassis that has made Ford Model T Touring Car so deservedly popular)—It will give years of service.

Fixed Prices on Quantity Orders for Ford Motor Cars for Commercial Purposes

¶ To concerns who purchase Ford Cars in quantity lots for Commercial Purposes we will give the benefit of a rate reduction or discount; we have fixed a sliding scale of prices which will be submitted on request. Catalogs and detailed descriptive literature will be mailed gratis. Branch Houses and Large Distributors in all Principal Cities—Dealers Everywhere.

¶ Good dealers in unocupied territory are requested to write us.

Ford Motor Company

Detroit, Michigan, U. S. A.

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BE THE AUTOMOBILE DELIVERY MAN IN YOUR LOCALITY—There's No Time Like NOW

Every business condition points straight to the universal use of the Motor car system of delivery. Thousands of the more progressive merchants, in all lines of trade, have already adopted this system. These wide-awake business men are setting a terrific pace which the owners of horse and wagon delivery systems find it impossible to keep up to. Why wait until your competitors force you to own a light delivery motor truck? Why not **be the leader**—force **them.** There are thousands and thousands of examples to prove the wisdom of the motor delivery system. It is no longer a "chance." ONE

DART LIGHT DELIVERY

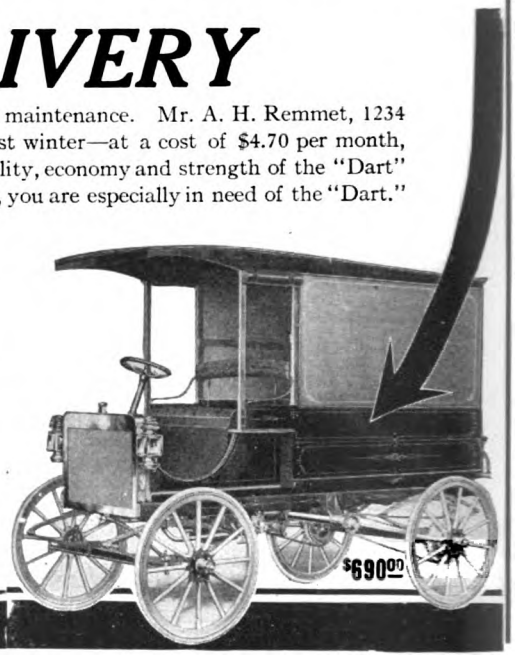
motor wagon does the work of 3 horses, 3 wagons and 2 men—at a big saving in cost of maintenance. Mr. A. H. Remmet, 1234 W. Chestnut St., Louisville, Ky., writes that he has run his "Dart" continually since last winter—at a cost of $4.70 per month, **including express of every** description. We have many other letters to prove the reliability, economy and strength of the "Dart" which has conquered all roads, all loads, all conditions of trade. If your case is exceptional, you are especially in need of the "Dart."

The "Dart" is the car you want for the utmost in a light delivery wagon. It has been tried, tested and proved a success over roads that horses could not travel, under loads greatly in excess of rated capacity. Its economy of fuel and oil is remarkable. The saving in time, money and work, the extra distance covered by the Dart—all these things should make you write at once for all the facts and proof of what we say. You owe it to your business—to your profits to at least get the facts—no matter what you think now.

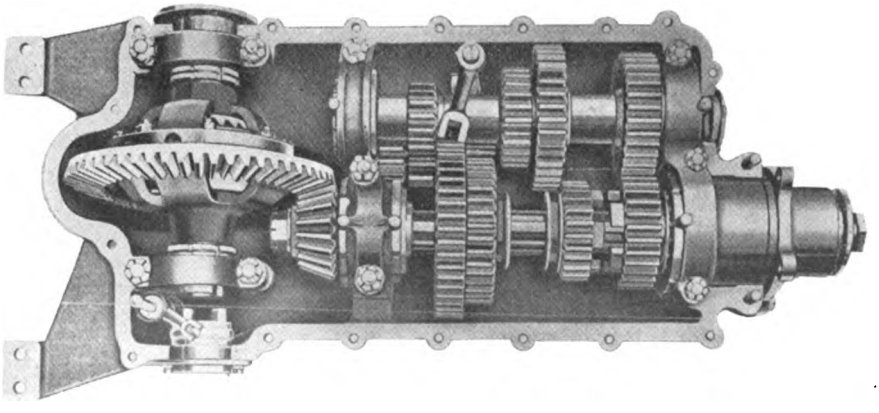
You will be astounded at the real meaning of the Dart System of Motor Delivery—regardless of how large or small your route is.

A REMINDER
To See The
DART DELIVERY CAR
At The
Chicago Auto Show

Dart Manufacturing Company
Dept. W. **WATERLOO, IOWA**



5-7 Ton Truck Transmission and Differential Unit



OPEN VIEW—Model 51 for 5-7 Ton Truck, Showing Differential Locking Device.

¶ Designed for 3-point suspension. Entire transmission carried in lower half of case. Timkin bearings. Gears of nickel steel, 5 pitch, 1½ inch face.

¶ Four speeds are provided, the direct drive being on the third speed, the fourth giving the advantage of a speed faster than the engine for use when the truck is running light.

¶ The reduction at the differential is 3 to 1, being accomplished by bevels of 2-inch face, four pitch teeth. Jackshafts extending into the differential are four-splined and carry on the right-hand side, housed within the transmission case, a DIFFERENTIAL LOCK which temporarily will suspend the function of the differential. One of the desirable features is the provision for secure locking of every adjustment or movable part. Careful provision has been made for protection against oil leakage.

3-point Suspension.

WRITE FOR DESCRIPTIVE PAMPHLET

THE WARNER GEAR COMPANY
MUNCIE, INDIANA

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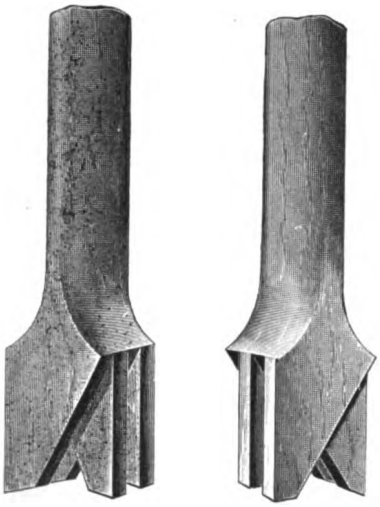

Schwarz Patent Spokes

Schwarz Wheels

are used on all leading Motor Trucks

Wheel for Heavy Motor Truck

Because they are STRONGEST, SAFEST and MOST ECONOMICAL; will stand up continuously under heavy strains; and are made with a first regard to quality and finish.

The construction of the SCHWARZ WHEEL alone insures its strength and durability. Spokes at the tenon are grooved and mortised, and interlock—forming an absolutely compact and immovable assemblage which cannot loosen. It is the only wheel with positive and evenly distributed spoke support.

Can be made complete and shipped without hub.

We are pioneers in the manufacture of heavy truck wheels and the largest producers. We maintain a large, fully equipped department devoted exclusively to this work and are pleased always to design and proportion wheels in proper keeping with other features of construction. Consult us.

We make Automobile Wheels exclusively—for both pleasure and commercial cars.

Write for information.

We carry a full line of S. A. E. truck wheel bands.

THE SCHWARZ WHEEL CO.

FRANKFORD **PHILADELPHIA**

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AMERICAN MADE

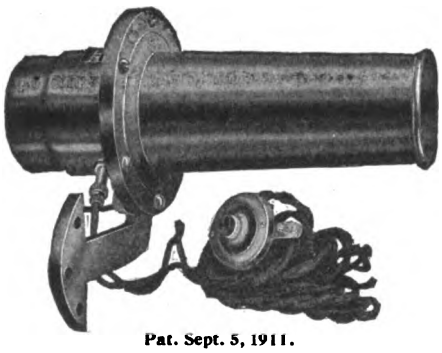
STANDARD SRB BEARINGS

are as much superior to the imported kinds as American Cars are to foreign cars.

Standard Taper Roller Bearings are especially adapted to commercial vehicle construction, as they possess many distinctive features not found elsewhere.

If You Can Buy the Best, Insist on Standard Bearings.

STANDARD ROLLER BEARING COMPANY
PHILADELPHIA



Pat. Sept. 5, 1911.

THE LATEST "NEWTONE"

MADE IN THREE STYLES

"The Mile Away Motor Horn"

Standard Equipment for 1912 Cars

TORPEDO TYPE

A Beauty Just Out

Price $20.00 COMPLETE, INCLUDING BUTTON and CABLE.

ONCE HEAR THIS HORN AND YOU'LL NEVER USE ANY OTHER

EFFICIENCY—ECONOMY—STYLE

All embodied in this horn. Its agreeable warning note, powerful as the roar of a cannon, eliminates all worry of accidents.

The fields of our NEW MOTOR are made up of 75 very thin disks of special steel, thoroughly insulated—this new field construction produces **more power** with **less current** consumption.

Other signals having motor with solid cast iron fields require nearly 50% more current for the same power, and what is more to be noted is that your storage battery will be ruined by being forced to discharge more amperes than the capacity of the battery will stand—ask the electrician, and he will prove it to you.

The NEWTONE Horn has been so perfected, that the harsh, disagreeable sound so common in other Horns, has been entirely eliminated.

Its tone is clear, sweet and musical, yet so powerful that it can be heard a mile away. It warns without startling.

If your dealer does not carry the Newtone, let us send you one on approval.

If not entirely satisfactory, return at our expense.

AUTOMOBILE SUPPLY MANUFACTURING COMPANY

220 Taaffe Place, near De Kalb Avenue **BROOKLYN, N. Y.**

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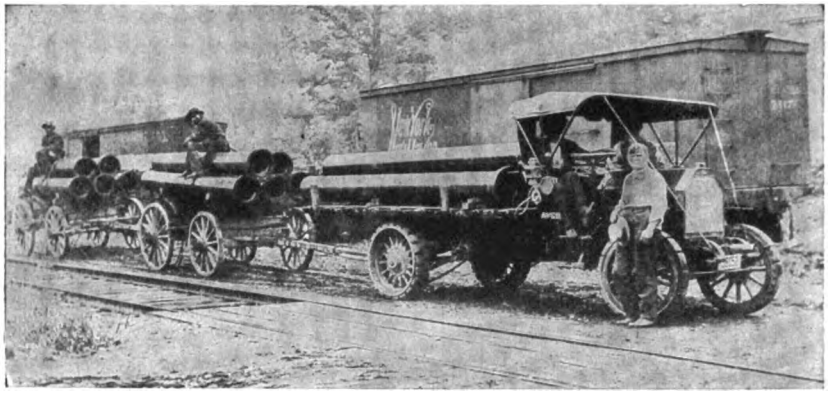


The Truck that Does the Most Work

Is the **Avery**—Here's Why—

It hauls big loads on its own bed.
It pulls trailers behind.
It has special wheels for city or country hauling.

Find out about the work the Avery will do.

How they carry full capacity loads and pull more than their capacity on trailers behind.

How they can be equipped with Rubber Tires for City Hauling and Wood Plug Tires for Country Hauling.

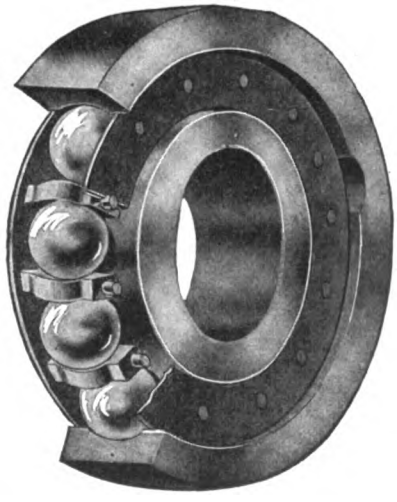
Get all the Facts about the Avery Truck

—the truck that does the most work. See them at the Chicago Truck Show. Also write now for complete catalog showing actual working scenes and giving full description. Address,

Avery Company - Manufacturers
949 Iowa Street - Peoria, Ill.

"SCHAFER" BALL BEARINGS

MADE IN GERMANY



¶ **"SCHAFER"** Ball Bearings are made of the finest extraordinarily dense crucible cast steel of special analysis, and carefully glass-hardened in the most painstaking manner by the most modern and accurate machinery, under the personal supervision of experts at our factories in Schweinfurt.

¶ Each ball bearing of the **"SCHAFER"** silent type contains one less ball than the full type radial bearings, whereas some other silent type radial bearings only contain sufficient balls to fill little more than half the entire ball race. It is obvious that the more balls the bearing contains, the more merit and greater carrying capacity the bearing enjoys.

¶ If there be merit to any ball bearing made, then the **"SCHAFER"** Ball Bearings are the most meritorious made, and can be measured by no other standard than their own.

BARTHEL, DALY & MILLER

Sole Importers

42 Broadway **New York**

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Right now your truck needs non-skid, long-wearing, quick-attachable

Swinehart

CELLULAR TRUCK TIRES

For the sake of the safety and economy, you should be using Swinehart Cellular Tires on your truck.

They effectually prevent skidding under all conditions—without the aid of chains or other devices.

Service tests have shown that they may be expected to return 12,000 to 15,000 miles, instead of the usual 5,000 to 8,000 of the ordinary type of ordinary truck tire.

Both of these features are remarkable.

Both are due to the perforations in the tread.

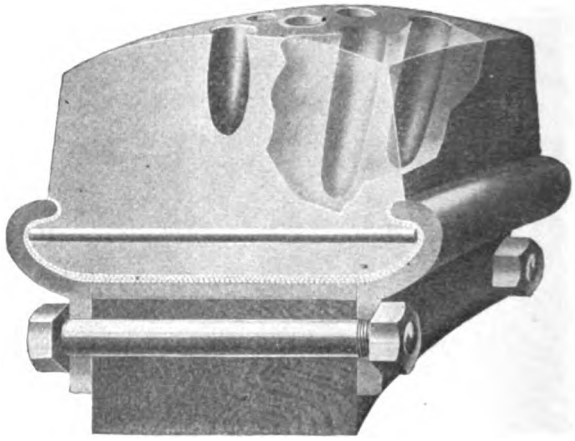
These perforations do three things which make the tire non-skidding and give it its extraordinary life.

First, they grip the road with the force and the tenacity of a vacuum. Their grip is more firm than that of chains, and they save buying new chains every week or so.

Second, they provide space for the compression or flow of the rubber as the wheel revolves. They make the tire more resilient than any solid tire can possibly be.

Third, they serve as radiators, carrying away internal heat and keeping the tire cool at all times.

They are permanent, too. They are deep—extending nearly to the fastening device—so that the non-skid effect is retained until the tire is worn out.



Sectional phantom view of the Swinehart Cellular Tire. Note the depth of the perforations; the absence of longitudinal wires; the quick-attachable flange rims —all good features peculiar to Swinehart Tires.

On top of all this—the tires fasten with the famous Swinehart quick-attachable flange rim, by which 30 minute changes are made possible.

There you have, in one tire, every essential that makes for economy, long service and safety.

And back of it all, a national reputation that is literally putting Swinehart on the best trucks and the most.

You can't ignore the weight of solid facts like these.

You can't ignore Swinehart Cellular Tires if you are looking for maximum economy and efficiency.

Chicago, Coliseum, January 27th to February 10th, Space No. 15.

Boston, March 2nd to 9th, 13th to 20th, Space 523 and 524.

The Swinehart Tire & Rubber Company

11 North Street, Akron, Ohio

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SPLITDORF MAGNETO

"Always There"

You Owe It to YOURSELF

To INVESTIGATE SPLITDORF IGNITION and its application to motor trucks and commercial delivery wagons.

Motor delivery service follows the law of economics, but, with its installation, deep consideration must be given by every owner or prospective owner to the question of ignition if for no other reason than economy.

SPLITDORF IGNITION is the MOST ECONOMICAL because it is the MOST RELIABLE.

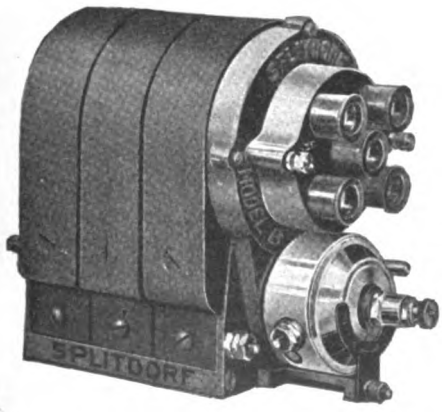
SPLITDORF IGNITION is the MOST EFFICIENT because it ALWAYS DELIVERS THE GOODS.

SPLITDORF IGNITION is the MOST PRACTICAL because you are always able to throttle down to a snail's pace with the positive certainty of starting on a quarter turn under all conditions—if you have SPLITDORF EQUIPMENT.

SPLITDORF IGNITION CHAMPIONSHIP SUCCESSES in the automobile, motorcycling, motorboating and aeroplane worlds only indicate the remarkable SPLITDORF efficiency and durability under the most severe tests.

Our SERVICE DEPARTMENT is at your disposal, so make a point of it TO-DAY to WRITE FOR INFORMATION.

Write for our Magneto Catalog



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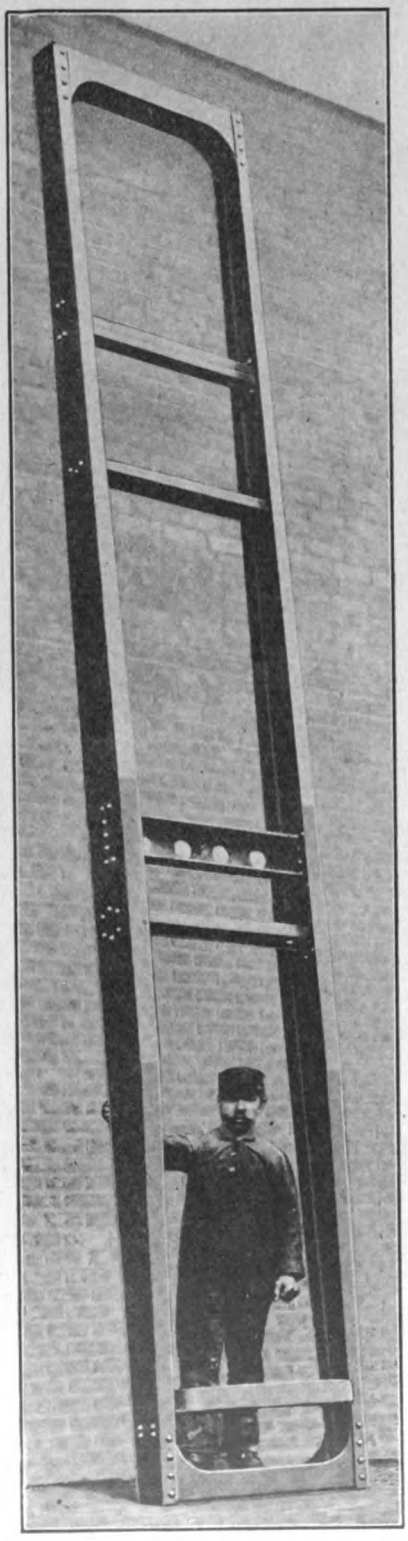
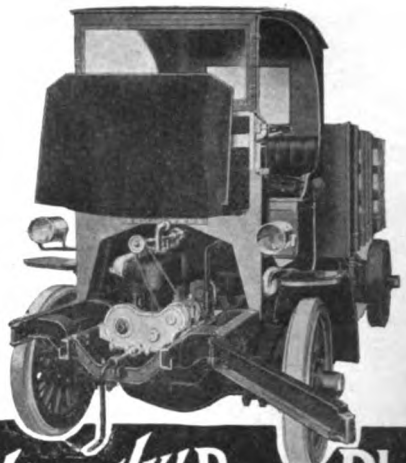


TRUCK FRAMES
½ TON TO 10 TON



Grabowsky Power Plant Slides Out Like A Drawer
That's Accessibility!!

THE entire power plant—the very heart of the machine—at one's finger tip ready for inspection or adjustment at all times, without holding up the car in service. Thus, efficiency is quadrupled. This feature of perfect accessibility is of vital importance, as inaccessibility results in neglect—neglect means heavy, unnecessary expenditure—early and rapid depreciation, loss of operating efficiency, we claim, and can prove.

Grabowsky Removable Power Plant is a Money Saver. A Time Saver!

$6.50/00 INSTEAD OF SEVERAL HUNDRED DOLLARS!

Every means provided to lessen the cost of repairs increases the value of a mechanical product to the owner. All working connections on The Grabowsky are protected with one of these Hardened Steel Bushings which take up the wear. To replace the entire number—when worn from normal use—costs only several dollars. Similar replacements on any other make truck would cost several hundred dollars. This feature also prolongs the life of the car.

ECONOMY IS A GREAT REVENUE!

Our lubricating system is another great lesson in economy. By use of our system about a pint of oil is fed the motor every three minutes—reclaimed and refiltered and used over and over again—making it more economical and efficient than that of any other make.

Aside from extraordinary engineering skill—**time and money saving features which no other car has nor can have**—the utmost care is exercised to the minutest detail of construction, material, treatment of same, expert workmanship, so that when you, Mr. Business Man, invest in a Grabowsky, you buy a truck that is commercially correct. You buy service! You buy economy!

Results Talk!

"We are using Grabowsky Trucks with the greatest success, delivering to all parts of the city and suburbs in all kinds of weather, and have never lost a trip. Before purchasing these trucks, we went thoroughly into this matter and wrote letters to truck users in other cities. In every instance a favorable reply was received from Grabowsky users." "Lipman, Wolfe & Co., Portland, Oregon."

"After using our Grabowsky all summer and running it 60 to 70 miles a day, we find the car to be all you claimed for it. It has given the utmost satisfaction. The upkeep has been far below our expectations. You may expect another order from us. "L. Metzger & Co., New York, N. Y."

"I have in use two 1½-ton capacity Grabowsky trucks. Same have been in daily operation (no holidays in my business). They have given good service and are certainly doing more and better work than any other make of truck now operated in this city. In this respect I have been making very close observation.
"W. C. Faust Transfer Co., New Orleans, La."

Agency territory available for busines men of standing!

Cars built to meet every commercial requirement. One to five ton capacity. Send for descriptive four cylinder literature.

WE INVITE INVESTIGATION! WRITE US TODAY!

"We Guarantee Service"

Grabowsky Power Wagon Co
1804 Mt. Elliott Ave.
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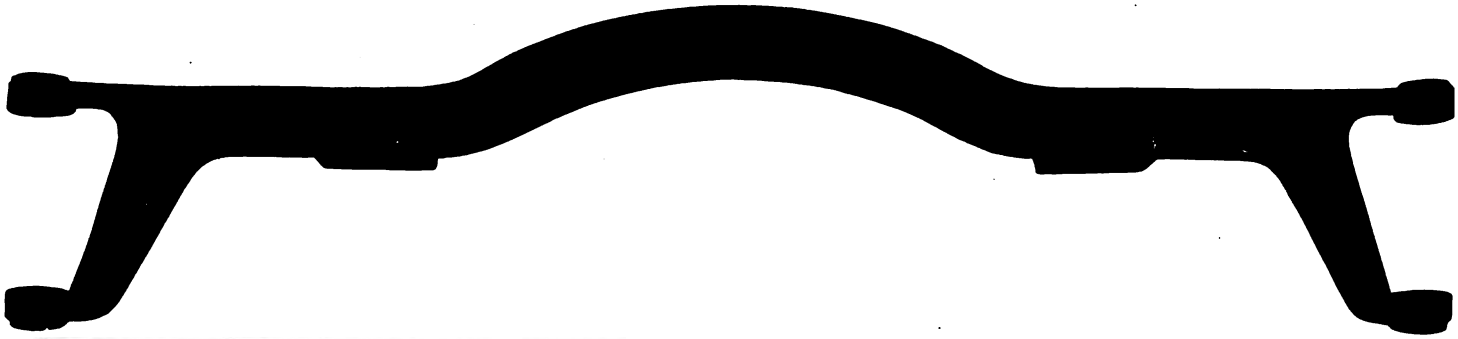
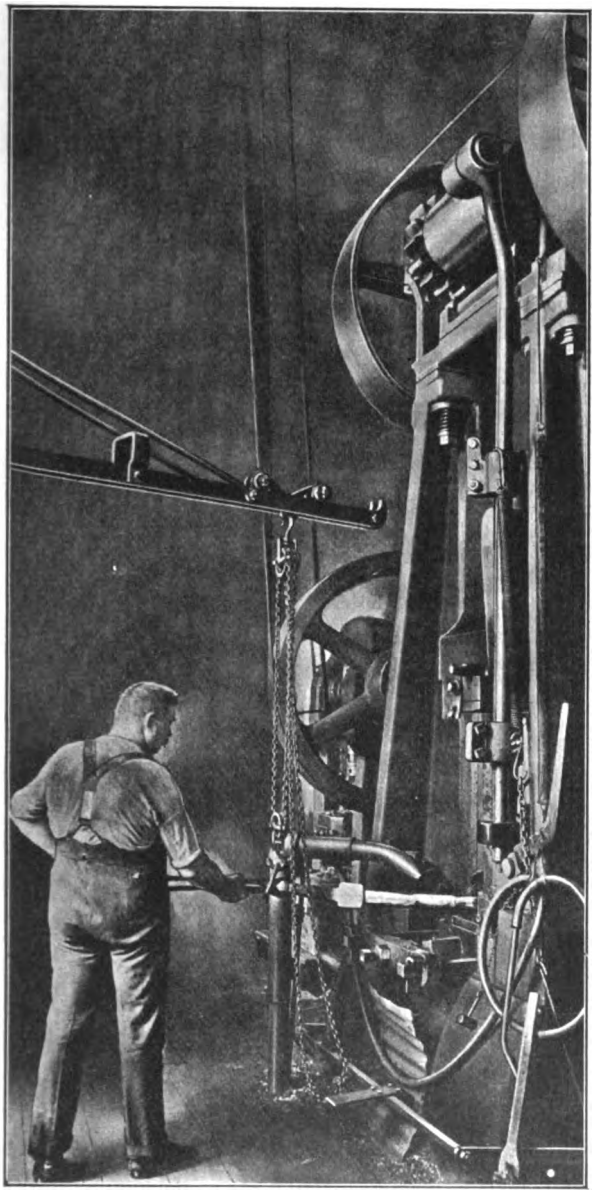
Bring Your Prints





Talk them over with us, at the Show.

If you will be in our territory "go through" our plant for the consideration of your best interests.

Your first trucks ought to sell others!

They must if you give value received!

We have to remember that not merely to purchase, not merely to use, but to buy and apply effectively means the success of any business.

Our bond of interests is mutual.

Considered by the service they render, J. H. Williams & Co. are the cheapest Drop-forgers in the country.

Ask them to prove it!

SPACE
No. 67 Coliseum, Chicago

J. H. WILLIAMS & CO.

Superior Drop-forgings

69 Richards Street, Brooklyn, N. Y.

546 Washington Boulevard, Chicago, Ill. CHAS. E. HATHAWAY, Representing

Please mention the "Power Wagon" when writing to advertisers.

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HIGH SPEED
NON-GRAN
BEARING BRONZE

"Will not metallize the oil"

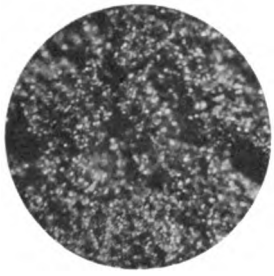
What is going on inside of your motor?

In an automobile motor the oil that passes through and lubricates any one bearing, is the same that passes through and lubricates all the other bearings and all the other moving parts.

Can you not see, then, that if any one bearing is of a granular, loose-knit structure, which is flaking off under frictional stress the oil passing through it will collect these metallic flakings and carry them to every other bearing and moving part in the motor and cause their rapid wear?

That is why the granular bronzes are rapidly being given up in automobile work and why NON-GRAN has now been exclusively adopted for all minor shaft bearings by that large class of manufacturers who have learned the wisdom of keeping their trucks out of repair shops.

These microscopic-photos show *why* the granular bronzes flake off and metallize the oil, and *why* NON-GRAN bronze can *not* flake off and can *not* metallize the oil.

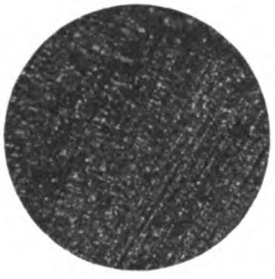


Granular Bronze

Granular Bronze

(Enlarged from a section smaller than the head of a pin.)

The white spots are the individual particles of which the bronze is made up, and between which, as you can readily see, there is practically no bond or connection. Result,—these particles are easily ground off under frictional stress and immediately saturate the oil.



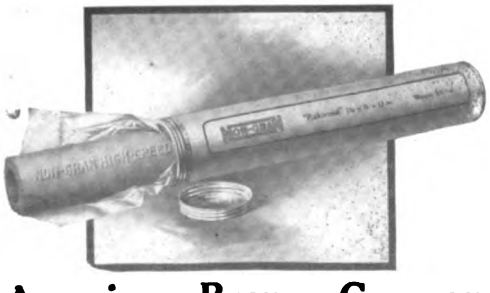
NON-GRAN Bronze

NON-GRAN Bronze

(Enlarged from a section smaller than the head of a pin.)

Note the bonding fibres which hold together every particle of NON-GRAN Bronze. These fibres — billions in number, which in actual size are far too minute to be seen—branch out in every conceivable direction and are so locked and interlocked into each other that they form a cohesive mass which frictional pull cannot disturb. Result, — the bearing itself lasts many times longer, and and the oil leaves it as clean as it enters it.

In selecting your new truck, or in repairs to your present truck, insist upon getting NON-GRAN Bronze in all of the minor shaft bearings.
Nearly 1200 Garages and Repair Shops are now making all their bearings, for replacement work, from NON-GRAN Cored-Bars. NON-GRAN Bars are stocked in every important city in the country by the leading Jobbing and Wholesale Hardware Houses. There is therefore no reason why you need tolerate granular bronze and metallized oil.



Our booklet W is a non-technical treatise on this whole subject. It is of dollars and cents value to every truck owner—shall we send you a copy?

American Bronze Company, Berwyn, Pa.

Eclipse Lumber Co., Clinton, Iowa, operated this Wilcox Truck from Sept. 19, 1910, to Sept. 19, 1911, under a most careful system of records of repairs and maintenance expense. A comparison with the cost of horses shows that the truck saves $150.00 per month net. See figures below.

WILCOX TRUX

Have Demonstrated their Positive Reliability and Economy of Operation in Eighty-Four Different Lines of Business

NO DOUBT YOURS IS AMONG THEM

If not, there are many lines of business with delivery requirements identical with yours, in which the efficiency and economy of using Wilcox Trux is established beyond argument.

If you will give us the details of your delivery system (blanks on request) we will give you the experience of several firms whose problems were the same as yours. We'll send you the figures that show the result of careful records and experiments, which you can check up yourself and apply to your own system.

THE FIGURES OF ECLIPSE LUMBER CO.
Sept., 1910, to Sept., 1911

Truck:

Incidental expenses	$ 8.75
Gasoline and Oil	183.23
Repairs	84.15
Driver	752.50
Helper, one-third of time	160.00
Insurance	97.00
Interest	165.00
20% depreciation	412.50
TOTAL EXPENSE	1863.13

Horses:

5 horses at $1.00 per day each for feed, shoeing and rent and 3 drivers at $6.00 per day	3410.00
Interest at 6% and depreciation at 15%	262.50
Total expense of horses	3672.50
Total expense of truck	1863.13
Saving per year	1809.37

Itemized figures on Request.

THIS VALUABLE INFORMATION

is yours for the asking—without restriction and without obligations.

No matter whether you are in the market now for a truck or not,—No matter which truck you finally decide will give you the maximum efficiency at minimum cost,—No matter whether you ever buy any truck you will profit by corresponding with our traffic experts.

H. E. WILCOX MOTOR CAR CO.
1039 Marshall Street, N. E. Minneapolis, Minn.

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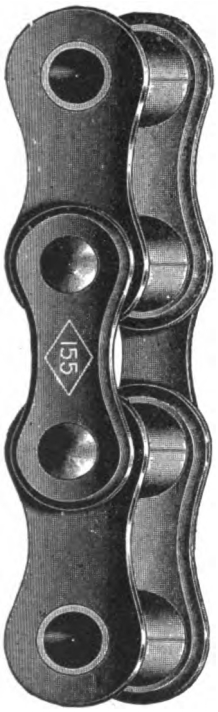
THE DURABLE DAYTON
MFG'D. BY THE DAYTON AUTO TRUCK CO. DAYTON OHIO
CHICAGO TO NEW YORK RELIABILITY RUN
LOADED WITH 6000 LBS. SWIFTS PRIDE CLEANSER
CONSIGNED TO JAMES BUTLER NEW YORK CITY
THE TRANSPORTATION PROBLEM SOLVED

A SEVERE TEST FOR DIAMOND CHAINS



This Dayton Truck delivered its 3-ton load into New York twelve days after leaving Chicago, and at a time when the roads were unusually bad. It is obvious that the chain equipment selected by any manufacturer, risking the reputation of his product on such a hazardous journey, would be absolutely the best.

That the confidence manifested in Diamond Chains by their use in this instance and on Dayton Trucks for years, is not misplaced, was shown by the splendid chain performance on this 1141 mile trip. In spite of the constant heavy tension and the bad stretches of roadway—some deep in mud—the chains performed their work perfectly. The conditions throughout were more severe than those of ordinary service, so that the demonstration of reliability was thorough.

Diamond Chains have always enjoyed an enviable reputation for reliability, long life and absence from repair troubles, even under adverse conditions. Their position as favorites of America's most prominent motor truck manufacturers has been obtained through real superiority—up-to-the-minute improvements in design, steel, and manufacturing methods.

Our engineers will advise without charge on designing problems.

TRADE ◇ MARK

DIAMOND CHAIN & MFG. CO.

243 W. Georgia Street, Indianapolis, Ind.

CAPACITY, 8,000,000 FEET PER YEAR

WRITE for this book before purchasing any commercial vehicles. It contains 48 pages, illustrating Detroit Electric Commercial Vehicles together with detailed information. Whether you intend to buy a fleet or a single self-propelled vehicle, it will pay you to get in touch with us. Remember—that to electrify is to simplify. This book will give you information on the following subjects:

Life of the Vehicle, Fire Hazards—Insurance,
Reliability of the Vehicle, Speed,
Simplicity of operation and care,
Yearly operating cost.

Detroit Electric delivery service will save you money and extend your territory of delivery operation. Our Service Department will be glad to help you solve your delivery problems and methods, both inside and out; and will recommend the proper types and sizes best suited for the work to be accomplished.

Commercial The Detroit Electric Vehicles

Kindly give us all the information you can in your first letter.

To those writing on their business stationery, indicating their position, no charge will be made for the book. Otherwise please inclose 8c in stamps.

Anderson Electric Car Company

455 Clay Avenue, DETROIT, MICH.

BRANCHES—New York, Broadway at 80th St.
Chicago, 2416 Michigan Ave.
(Also branch at Evanston, Ill.)
Brooklyn, Buffalo, Cleveland,
Kansas City, Minneapolis, St. Louis.

Selling representatives in all leading cities.

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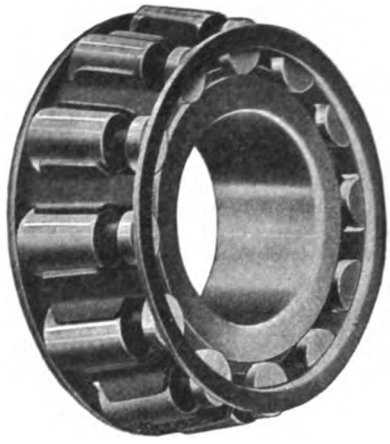

Timken Roller Bearings at the Big Show

73 6-10% of the car and truck builders who exhibited at *Madison Square Garden* use Timken Roller Bearings in part or throughout.

44 7-10% of the car and truck builders who exhibited at *Grand Central Palace, New York*, use Timken Roller Bearings in part or throughout.

70 2-10% of the pleasure car builders who exhibited at the *Coliseum, Chicago*, use Timken Roller Bearings in part or throughout.

52 9-10% of the motor truck builders who exhibited at the *Coliseum, Chicago*, use Timken Roller Bearings in part or throughout.

The reason for such wide adoption of Timken Bearings is that they give satisfactory service in every place where they are used.

The Timken Roller Bearing Co.

Canton, Ohio, U. S. A.

The only axle manufacturer licensed to make automobile axles equipped with Timken Roller Bearings is The Timken-Detroit Axle Co.

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Lubricating The Motor Truck

The hands on your watch would be almost useless if used on a clock face, and for the same reason ordinary lubricants cannot successfully carry the heavy motor truck up hill and down and over all sorts of roads.

DIXON'S MOTOR LUBRICANTS

are ideally adapted to meet the difficult lubricating requirements of the motor truck, for flake graphite, their basic ingredient, has time and again proved its efficiency where other lubricants have utterly failed. May we send you free sample 229-G?

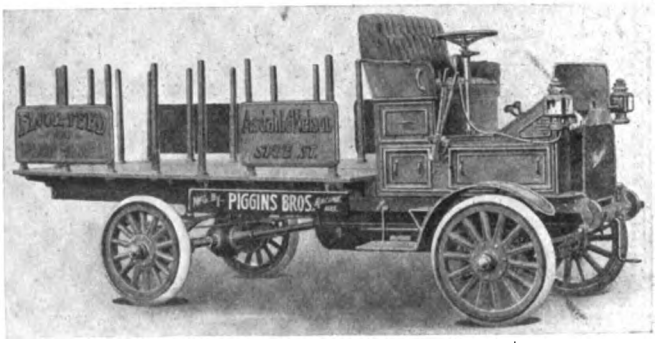
Joseph Dixon Crucible Company
Jersey City, N. J.

THE PIGGINS MOTOR CAR CO.

of Racine, Wisconsin, manufacture a complete line of motor trucks from 1 to 10 tons capacity.

Simplicity and accessibility are the dominant features of our long stroke truck motor.

Also as there is no chains to break and no sprockets to wear out as our trucks have a double rear axle and are all gear driven.

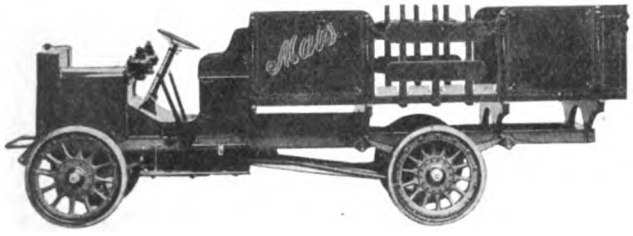


Two-ton model of Piggins Motor Car Co., Racine, Wis.

Send for catalog showing complete line of models.

Choice territory open to responsible dealers.

PIGGINS MOTOR CAR CO.
RACINE :: :: WISCONSIN



MAIS MOTOR TRUCKS

are more efficient under every condition than any others. The **Internal Gear drive** is one reason. Many other features help to make the Mais.

THE BEST AMERICAN TRUCK

The Mais Motor Truck Co.
Indianapolis, Ind.

HARRISON

The Tubular Truck Radiator shown below is one of the many styles we manufacture and they are all giving universal satisfaction under the severe conditions incident to this service. In fact, we have yet to hear of a failure, either as to efficiency or stability

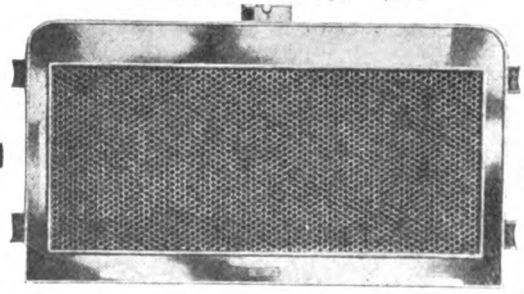
This stability is due to a minimum of PARTS AND SOLDERED CONNECTIONS—we have one seam for each seven tube element.

It is also due to use of the very best material and workmanship.

The efficiency is owing to free circulation of water, and high impingement of air

We also manufacture cellular and tubular radiators for pleasure cars.

THE HARRISON RADIATOR CO.
LOCKPORT, N. Y.
Detroit Office, 1422 Ford Building,



Send us your blueprints and specifications and we will be pleased to estimate on your requirements.

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Standard Parts

For Motor Truck Builders

¶ With the exception of springs and wookwork, we manufacture a complete line of standard parts for motor trucks of 1, 2, 3, 4 and 5 ton rating.

¶ We will gladly furnish prints of chassis of models which can be built up from parts we make.

¶ Firms engaged in the production of motor wagons should not overlook the importance of investment entailed by providing both factory space and facilities for assembling. Money must be freely spent for this purpose for a number of years to come, while throughout the period the models produced will be gradually assuming final form. Whatever this minimum investment may be, it must be apparent at the outset that the only way to keep it low, and at the same time maintain factory output, is to draw upon the engineering skill and resources of the parts maker, who in order to exist must provide unusual facilities for quantity production and anticipate every change in a very sensitive market.

¶ We have the reputation for doing big things in a big way. Our large plant and our talented engineering force are wholly at your service in order to simplify your problems of production.

¶ If you need advice from a firm which has acquired experience in the making of motor truck parts—and knows the arduous duty to which they are subjected in commercial practice—consult us.

Chicago Show Space—No. 10 in Coliseum Gallery

Blue Prints on Application.

Driggs-Seabnry Ordnance Corporation

SHARON, PENNA.

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PROSPERITY FOR THE NEW YEAR

TO ALL THOSE WHO STANDARDIZE THEIR EQUIPMENT WITH

DEFIANCE

Automobile and Heavy Auto-Truck Wheel Machines

THE MACHINES WITHOUT A PEER

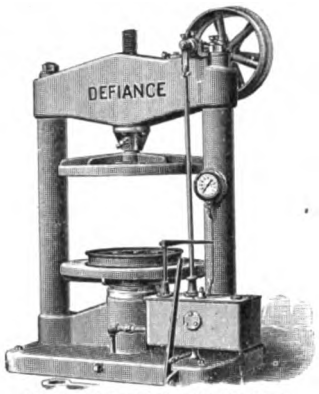
They are equipped with the latest devices for quick adjustments and safety, and readily prove their ultimate worth. Each tool is well balanced, and will keep running day after day under heavy working pressure.

WE STAND READY TO SUBSTANTIATE ALL CLAIMS MADE

For any of our tools and guarantee them to be perfect in every particular.

Address Dept. V. for full particulars and prices.

Tire Measuring Machine

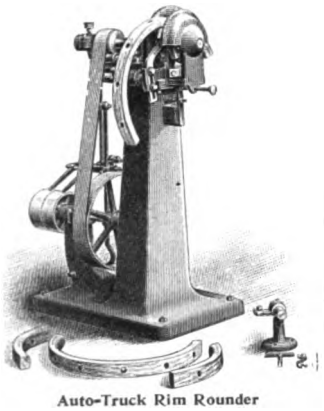


No. 5—60 Ton Hydraulic Tire Press

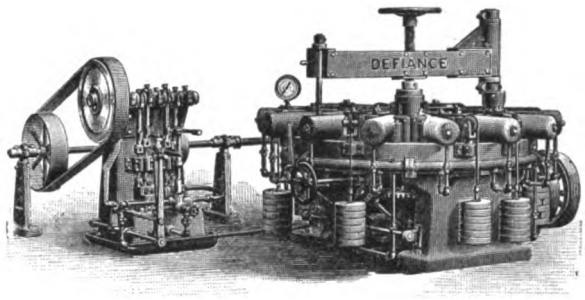
THE DEFIANCE MACHINE WORKS

DEFIANCE, OHIO

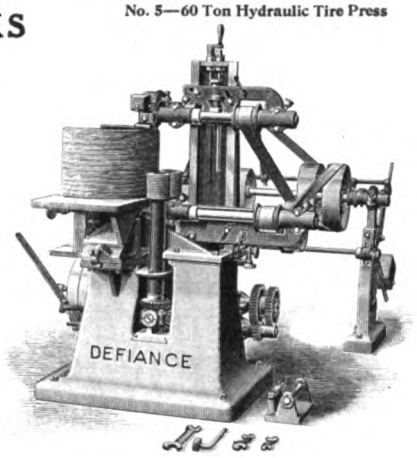
When in Chicago see our exhibit at 1219 Washington Boulevard



Auto-Truck Rim Rounder



No. 200—Heavy Auto-Truck Wheel Assembler



No. 6—Heavy Auto-Truck Rim Planer

"Now I know what's wrong Those aren't GOULD BATTERIES"

That extra ten to twenty miles per charge, obtainable only in vehicles equipped with Gould Batteries, makes electrics reliable on long runs—does much to prevent troubles like those shown.

Gould Batteries produce the greatest power from a given battery space and weight, hence cars so equipped give better speed and mileage, and are less subject to tire troubles. As to freedom from repair troubles and frequent renewals, let us refer you to a few users in your neighborhood. Write for booklet.

Gould Storage Battery Co.

General Offices: 341 Fifth Ave., New York City. Works: Depew, New York

San Francisco: 605 Atlas Bldg. Chicago: The Rookery Boston: 89 State Street Cleveland: American Trust Bldg.
Agents in: Washington, D. C., Cleveland, O., Kansas City, Mo., Denver, Colo., Topeka, Kas., Los Angeles, Calif., Seattle, Wash.
Full Stocks of parts, plates and repairs carried by all offices and agents

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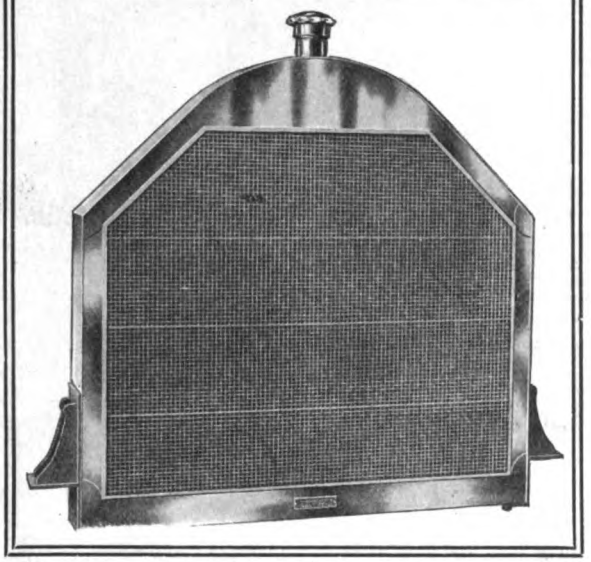
BUSH RADIATORS



FOR

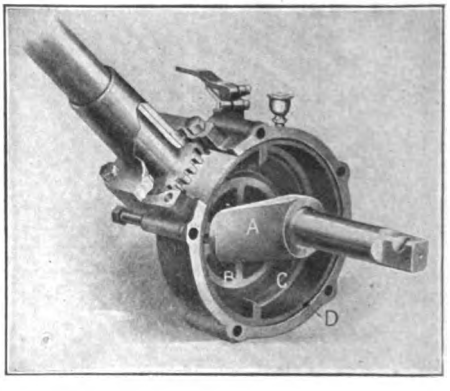
Motor Trucks
Traction Engines
Log Haulers
AND
All Commercial Uses

CATALOG ON REQUEST

THE BUSH MANUFACTURING COMPANY
HARTFORD, CONN.

STEERING GEAR

Baldwin (Brown) Patent Steering Gear is now ready for delivery. Is especially suitable for commercial cars. Is novel and interesting because it is on new lines, and eliminates all gear and line contacts in the working parts. In substitution for these we have large surfaces operating in oil; consequently the gear will wear for years. Without "back-lash" and needs no "take-up."



Send for Circular, Descriptive Matter and Prices.

BALDWIN CHAINS AND SPROCKETS

BALDWIN CHAIN & MFG. CO.
WORCESTER, MASS.

AGENTS { H. V. GREENWOOD, 150 Michigan Ave., Chicago, Ill.
C. J. IVEN, Rochester, N. Y.
M. A. BRYTE, 788 Mission St., San Francisco, Cal.

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The Most Complete Success of the Electric Wagon or Truck

is assured by the

"National"

STORAGE BATTERY

¶ For many classes of city delivery the Electric Wagon and Truck are forging to the front because of their indisputable economy, ease of operation and all 'round satisfactoriness.

¶ The electric wins as a straight business proposition and it is as the same kind of proposition that the National Storage Battery is growing in favor. This battery has been perfected as to design and as to manufacture so as to insure the kind of operating service that will deliver the goods on time all the time, in Winter as well as in Summer, at the lowest cost.

¶ Investigate storage batteries and see to it that your electrics are equipped with the National Battery.

The United States Light & Heating Company

General Offices: 30 Church St., New York

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SALES OFFICES AND DEPOTS:

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"KELLS"

The most Durable and Efficient

RADIATORS for Commercial Cars

Positively guaranteed not to leak for two years.
Used on all the **Leading Gasolene Trucks of America.**

Ten Years Test Has Proven the Best.

BEWARE OF IMITATIONS.

W. J. KELLS MFG. CO.
521-25 W. 45th Street, NEW YORK CITY

THE PARK DROP FORGE COMPANY
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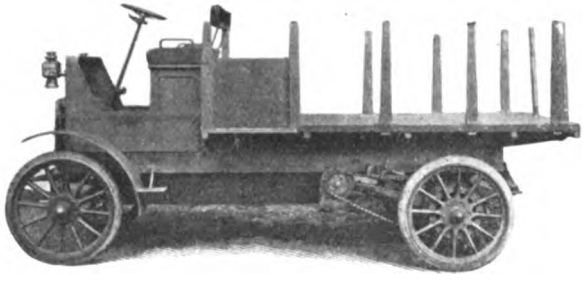
Our newly designed 1500 lb.—2000 lb.—3000 lb. capacity motor trucks are now ready for prompt delivery to merchants, buyers and dealers.



These models are of the most modern design, being equipped with long stroke one cylinder motors especially designed for truck service. The transmission is 50% more than ordinary rating, and its parts are exceedingly heavy and rugged.

Write for illustrated catalog

Ideal Auto Truck Company
Fort Wayne, Indiana

A Seitz 3-Ton Truck That Has Seen 3 Years' Service.

It Costs 70 Cents to $1.20 Each Day to Merely Keep a Horse

His "keep" costs over 100% of his worth. A good team costs at least $2 a day just for their "keep" and this cost runs 365 days a year. A SEITZ 3-ton truck will do the work of three such teams **and at much less cost.**

Our big catalog tells all about the SEITZ and its wonderfully simple DOUBLE FRICTION TRANSMISSION—how one lever controls everything, how it does away with both clutch and gears and has automatic change of speed without releasing power, how bearing pressure is neutralized, why it has more usable power—an interesting story that you ought to have if you are thinking of trucks. Just say "Send me your Catalog."

Seitz Automobile & Transmission Co.
219 Beecher Ave. **Detroit, Mich.**

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THE "SPICER"

universal joint was the pioneer for shaft driven automobiles—either pleasure or commercial cars.

Consult Our Representatives:

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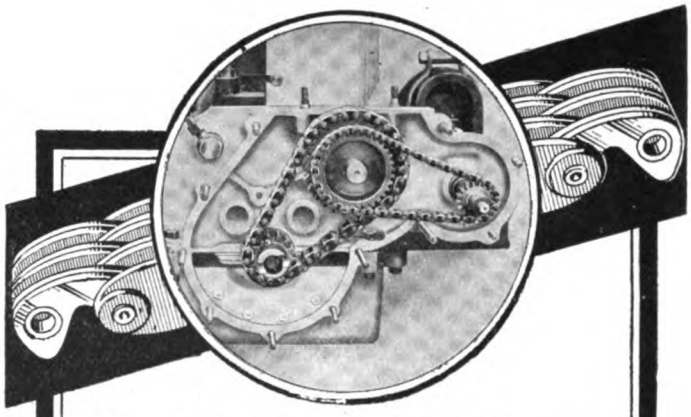
L. D. BOLTON,
1810 Ford Building,
Detroit

Special Foreign Representative:
BENJ. WHITTAKER, 21 State Street, New York



The Highest Standard of Efficiency
in magneto, camshaft, and pump drives is reached by the application of the economical, reliable and silent

COVENTRY NOISELESS CHAINS

The precision, automatic retention of pitch and long life are a few of the facts taken into consideration by many manufacturers of the most silent, reliable, and fashionable cars who fit these chains exclusively.

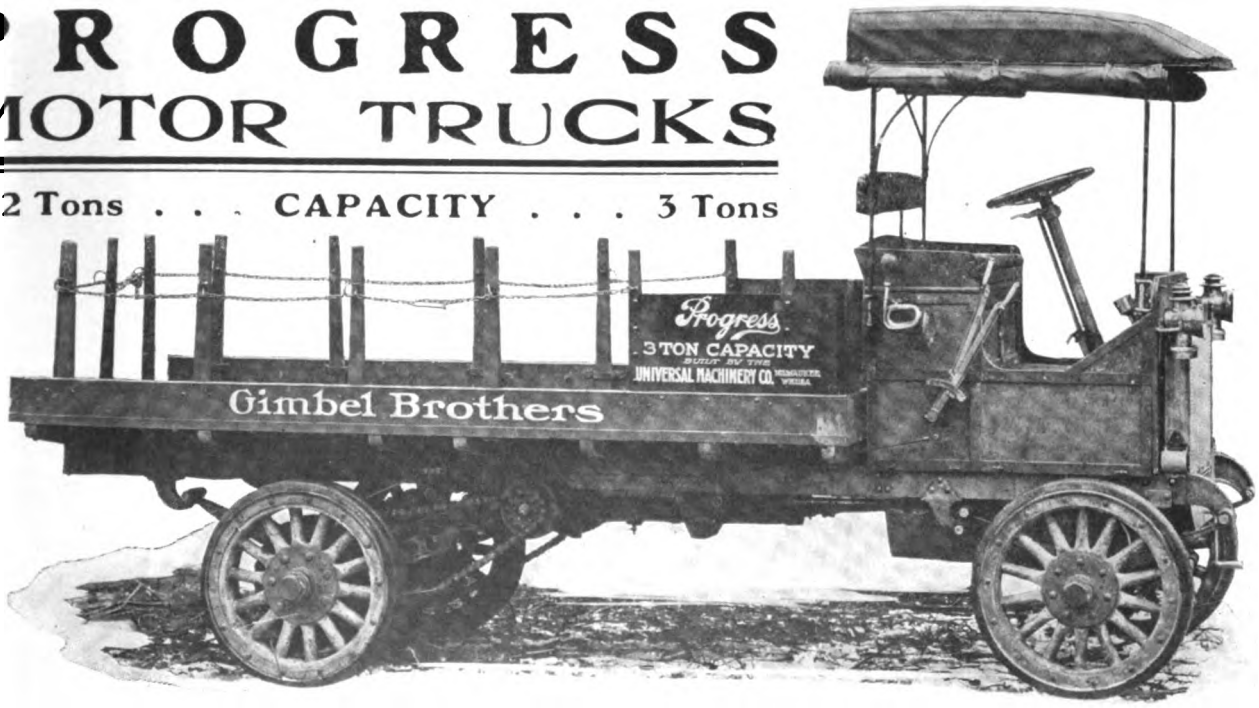
The services of our experts are at your disposal.

WRITE TODAY.

United States Representatives:
S. HOFFNUNG & CO., LTD.
114 Broad St., New York

PROGRESS MOTOR TRUCKS

1 1-2 Tons . . . CAPACITY . . . 3 Tons



THREE TON TRUCK

In the **Progress Motor Trucks** are years of experience both in engineering and building. The **Progress Motor Trucks** are **built** in our factory not **assembled**, and **built to last.** We have been builders of auto and engine parts for years.

DEALERS—We have territory open for responsible parties. Write for Catalogue and Proposition.

Universal Machinery Co., Milwaukee, Wis.

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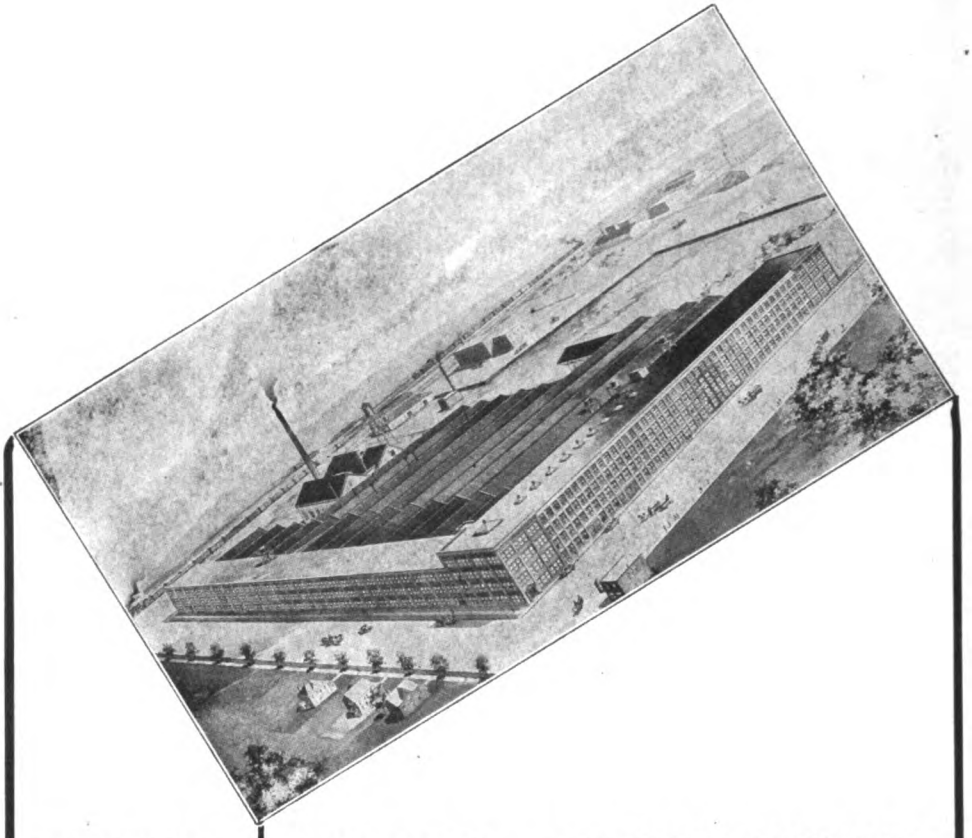

MOTOR TRUCK BANDS

MADE IN ACCORDANCE WITH

S. A. E. DIMENSIONS

OWNERS—MANUFACTURERS

We are now prepared to furnish motor truck bands according to new Standards adopted by the **Society of Automobile Engineers.**

The quality and workmanship is such as we have always produced—of the best.

You **must** recognize the benefits of having the *world's largest rim factory* make your rims, bands and flanges.

Nowhere can you secure so efficient a combination of experience and facilities.

OFFICES IN:
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CHICAGO
DETROIT

THE STANDARD WELDING COMPANY
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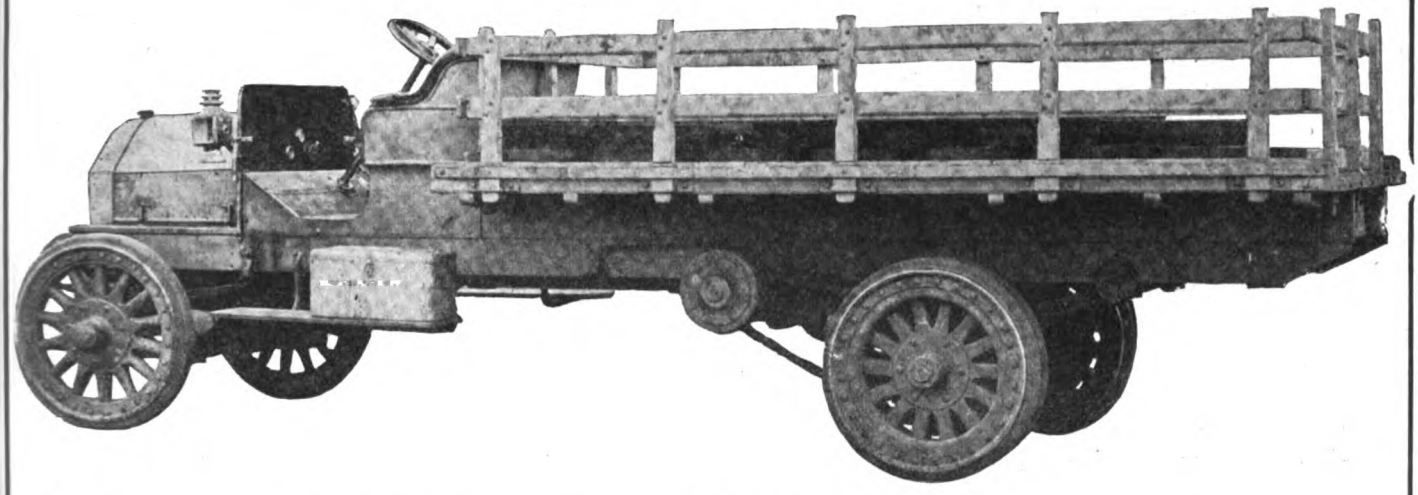

"Spare the Oil and spoil the Car"

PENNIES saved on oil or grease may mean dollars spent in upkeep—not to mention annoying delays or the shortened life of your car.

For motorists who recognize the economy of using the best oil we have produced Polarine.

It is not a low-priced oil. But in the long run it will prove sound economy.

Polarine Oil goes through special processes of distillation, pressing and reducing. It is then carefully cleaned and filtered to remove impurities and free carbon. This secures the correct lubricating qualities for gas engine use.

Polarine leaves no appreciable carbon deposit.

Its consistency or "body" is not materially affected by either high or low temperatures. It flows freely down to zero.

Polarine

The Polarine Brand covers:

Polarine Oil (in gallon and half gallon sealed cans, in barrels and half barrels), ***Polarine Transmission Lubricants, Polarine Cup Grease*** and ***Polarine Fibre Grease.***

These lubricants cover the needs of every part of the car.

Send to our nearest agency for "Polarine Pointers" which includes hints on the care of motor cars.

Standard Oil Company
(Incorporated)

Polarine Oil

for all types of gasoline engines. It is delivered in sealed cans—gallon and five-gallon sizes—or in barrels and half-barrels.

Polarine Transmission Lubricants

are prepared in three consistencies—"A" "B," "BB." The cans are of convenient size.

Polarine Fibre Grease
Polarine Cup Grease

Delivered in round cans.
More information in our booklet.
Send for it.

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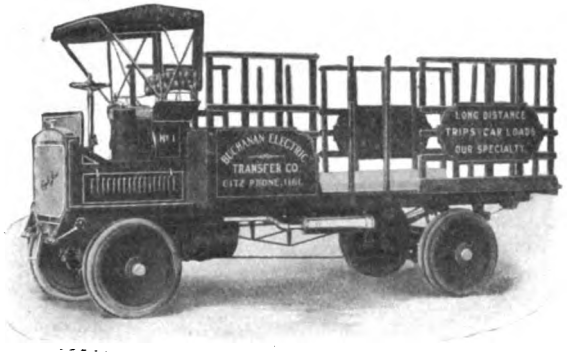

BUILT in Two and Three Axle equipments. 3½ to 10 ton capacities. Especially adapted for long hauls and difficult road problems.

Let us send you literature and full information

Couple-Gear Freight-Wheel Company, 550 Buchanan Street, Grand Rapids, Michigan

THE

POSITIVE

Positive Plain

Lock Washer

Made in all sizes and weights for Automobile purposes and Trucks or Power Wagons. Can be used thinner than any other lock washer—effective, no matter how thin. One lock under the nut and head can be used if so desired. Exhaustive tests, covering a period of nearly 20 years on railroad track, drop presses, Automobiles and machinery subject to vibration, have proven its superiority over every nut lock manufactured. *Write for samples and prices.*

The original and genuine Positive Lock Washers are made *only* by the

POSITIVE LOCK WASHER CO.
NEWARK, N. J.

Factory of Hudson Motor Car Co., Detroit, Mich. Fitted with Detroit Fenestra Solid Steel Windows.

A 25% Daylight Investment

There's no industry more in the spot light than the manufacture of automobiles. It's a go-ahead, up-to-the-minute business that demands the best in efficiency and surroundings.

The many *Automobile Factories and Garages* that are equipped with

Detroit-Fenestra PATENTED Solid Steel Windows

are a substantial proof of the correct principles of Detroit-Fenestra construction. 25% more daylight and ventilation are obtained through Detroit-Fenestra. These two great factors in efficiency tell their own tale in results. But there is something more needed—strength and durability.

Detroit-Fenestra Solid Steel Windows possess strength and durability far above any other method of window construction. They are permanent, weather-proof, fire-proof and our special patented joint gives extra strength just where it is needed—at the point of intersection. That's the weak point in most sashes but in Detroit-Fenestra it's the strongest because there's no metal lost and the whole is joined together like a solid piece of steel.

Let our engineers prepare you an estimate for fitting your plant the Detroit-Fenestra way. There's only the one cost. Upkeep cost is nil. Manufacturers now recognize the fact that Detroit-Fenestra is not an expense but an investment that affects their bank account on the right side.

Let us send you a booklet. Write for it today.

Detroit Steel Products Company
Department 15
DETROIT :: :: :: :: MICHIGAN

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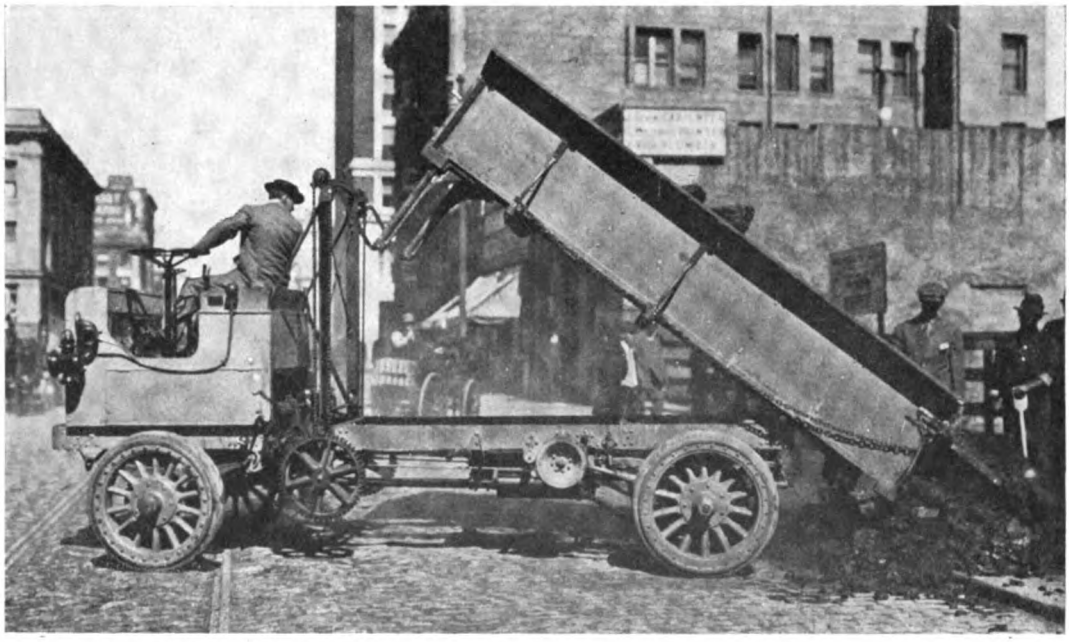


(Pat. Applied For)

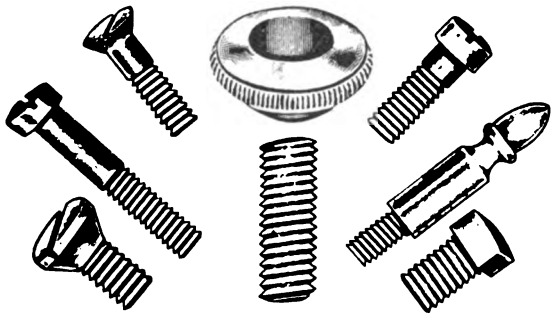
A POWER DUMPING DEVICE. THIS IS A SUCCESS.

Operated by a friction application to any part of the truck mechanism which is operated by the truck motor.

FOOL PROOF RAPID PRACTICAL CHEAP

Can be applied to any truck without changing in any way the design of the truck gears or power plant.
For particulars write

DUFFEY BROS. MOTOR TRUCK CO. 1133-1135 Market Street **San Francisco, Calif.**



Small Manufacturers

Don't tie your capital up in Screw machines—turn this class of work over to us.

We can do it quicker and cheaper for you and guarantee accuracy.

We are also prepared to do all kinds of machine work, hardening, tempering, grinding, polishing, plating and enameling.

Send blue prints for estimate.

National Cycle Mfg. Co.

Bay City, Mich.

HOTEL CUMBERLAND

NEW YORK Broadway at 54th Street

Official Hotel of the Automobile Club of America, American Automobile Association and Touring Club of America

Near 50th St. Subway Station, 53rd St. Elevated

New and Fireproof

Strictly First Class
Rates Reasonable

$2.50 with bath, and up

All Hardwood Floors and Oriental Rugs

Ten Minutes' Walk to

Thirty Theatres

Excellent Restaurant **Prices Moderate**

Send for Booklet

Harry P. Stimson

Formerly with Hotel Imperial

GARAGE NEXT DOOR

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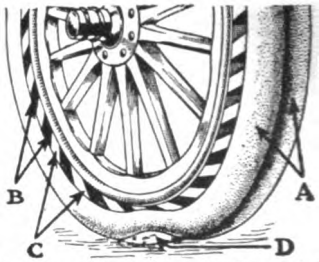
Insure Your Light Delivery Car From Damage by Using *Motz* Cushion Tires



A—in the picture shows double, notched treads.
B—shows undercut sides.
C—shows slantwise bridges.
D—shows absorbing means when passing over an obstruction.

The best way to insure the mechanical parts of your light delivery car from damage is **to equip it with Motz Cushion Tires.** Pretty near every injury to a delivery car can be traced to some jolt, bump, twist or racking strain which it receives in traveling over rough pavements and bad roads. The Motz Cushion Tire possesses such resiliency as to **absorb** these violent shocks and protect your light delivery car, thus greatly **lengthening its period of service.**

The Motz Cushion Tire gives the same resiliency as the properly-inflated pneumatic tire and longer service than a solid tire. **It is so resilient and efficient that all leading makers of electric pleasure cars now equip with Motz Cushion Tires.**

Note in the illustration the **double treads, undercut sides and slantwise bridges** of the Motz Cushion Tire. It is these exclusive patented features which give the Motz Tire pneumatic resiliency.

No Trouble to Put Them On

The Motz Cushion Tire possesses the added advantage of being **quick-detachable.** It fits any standard clincher, universal quick-detachable or demountable rim. It is therefore unnecessary to remove wheels when replacing tires. This means a big saving of time and enables you to get full service every day from your delivery car and the man who drives it.

Motz Solid Tires

Motz Solid Tires when heavy loads and not speed is a factor are ideal tires for heavy duty trucks. There unusual durability, together with the fact that they are furnished on demountable rims, make them most desirable for heavy duty trucks.

Let us send you more information as to the construction of Motz Tires and results which have been obtained by users of these tires on commercial cars.

In writing please ask for Booklet 92 and send your communication to

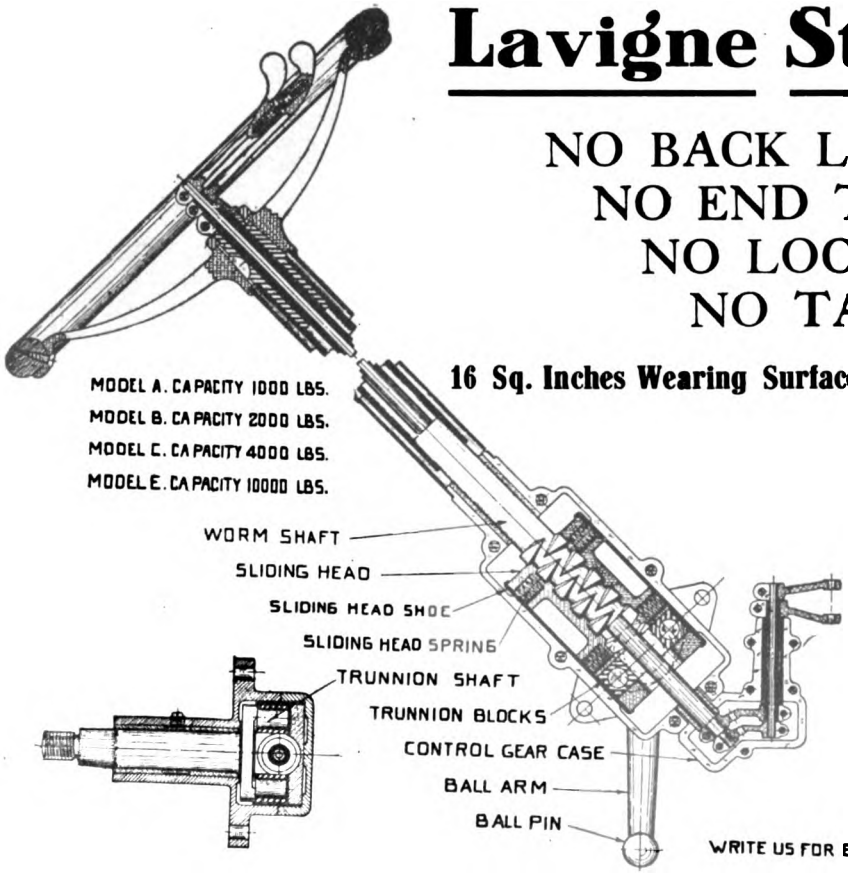
THE MOTZ TIRE AND RUBBER CO.
Factories and Executive Offices, AKRON, OHIO
BRANCHES—1737 Broadway, New York; 2023 Michigan Ave., Chicago: 999 Woodward Ave., Detroit; 409 E. 15th St., Kansas City.

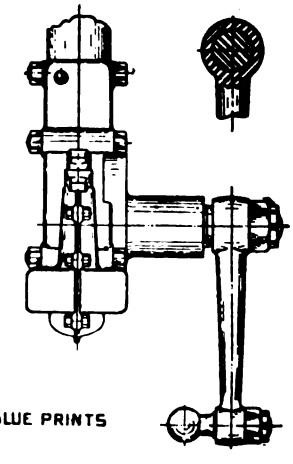
(204) **SEE OUR EXHIBIT AT THE CHICAGO AUTOMOBILE SHOW, SPACE 2-3; AT THE BOSTON SHOW, SPACE F535-536.**

Lavigne Steering Gears

NO BACK LASH
NO END THRUST
NO LOOSE PARTS
NO TAKE UP COLLARS

16 Sq. Inches Wearing Surface — All Adjustment Positively Automatic





WRITE US FOR BLUE PRINTS

LAVIGNE GEAR CO.
Detroit, Mich.

Factories:
Detroit, Mich.
Corliss, Wis.

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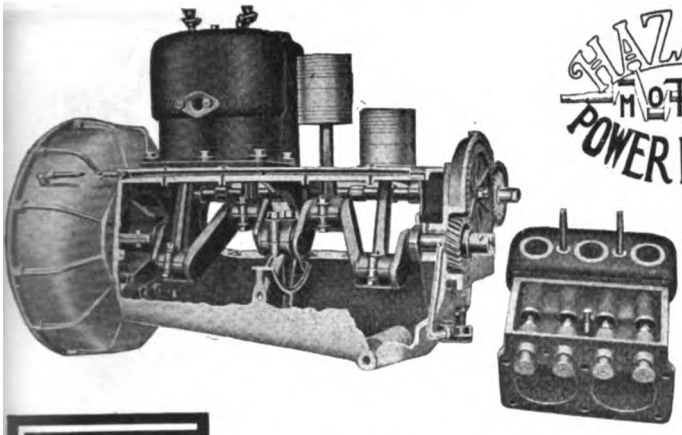

HAZARD MOTOR POWER PLANTS

One of Many Features of Hazard Unit Power Plants

Oiling System

The Hazard Oiling System is automatic and a combination of force feed and gravity. The base carries approximately two gallons of oil which is forced by a gear pump, driven by the timer shaft, to a channel through the engine base and is screened each time as it passes through the motor. This screen is easily removed without tools. From there it is delivered by gravity to a pocket over each of the crank shaft bearings, and a stream of oil also flows on the connecting rods as they revolve. This oil lubricates these bearings and throws the excess oil into the cylinders and upon the cams and cam shaft bearings. By this system all bearings are positively oiled, and all dirty outside oiling devices are eliminated. This is not a splash system of oiling, and connecting rods should not dip in the oil. No stuffing gland is used on the pump, which leaves no chance for an oil leak at that point. Motor will properly lubricate until all oil in crank pit is consumed. A settling pocket and drain plug are provided for the removal of carbon deposits. The base of cylinders has a small hole opening from the valve pocket to crank case, which serves the double purpose of returning the oil which works up around the valve tappets to the sump, and also permits a spray to form in valve pocket, which lubricates the valve stems and prevents sticking and wear

Other Features: Motor, Clutch, Transmission and Gear Shift Control in one compact Unit. No alignment of parts necessary. Three Point Suspension. Can be mounted in practically any car. Valves Enclosed.

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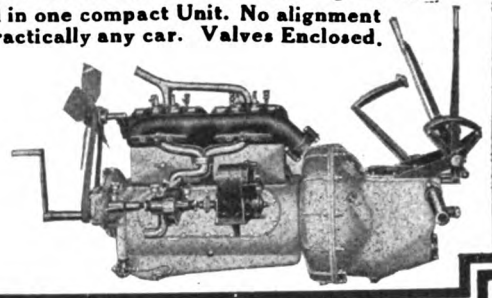
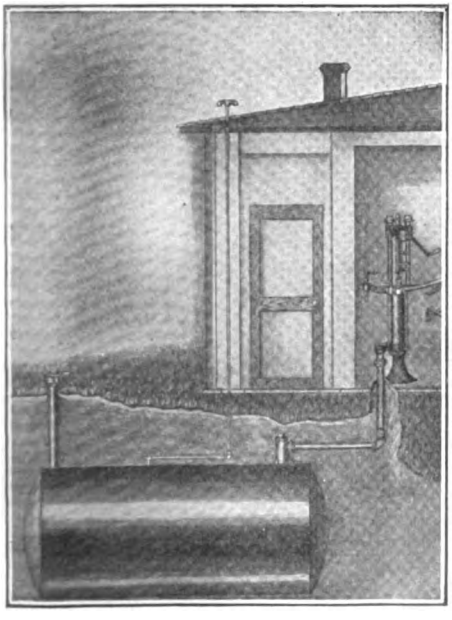
HAZARD MOTOR MFG. CO.

123 Coates Street, Rochester, N. Y.





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We manufacture Self-Measuring, Non-Measuring, Isolated, Inside Discharge and Multiple System **Gasolene Storage Outfits.**

Air Tight Tanks are constructed of 3-16 inch, or heavier, Open Hearth Steel with all seams and joints BRAZED. Every AIR TIGHT seam and joint is guaranteed to be as strong as the steel the tank is constructed of. A 100% tank.

Air Tight Outfits are listed by the National Board of Fire Underwriters

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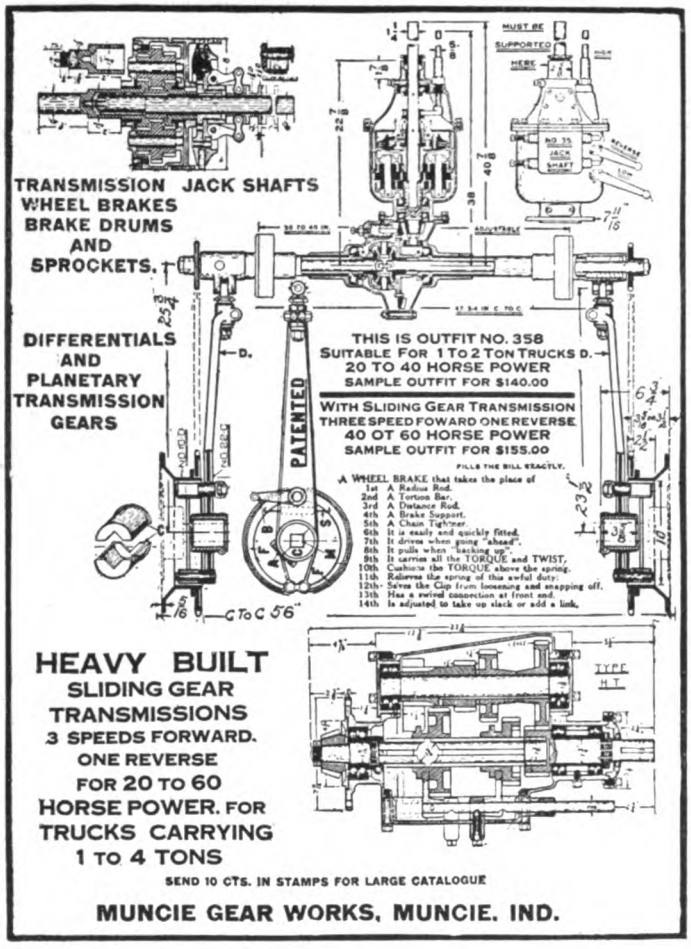

Culver-Taylor Detachable Chain

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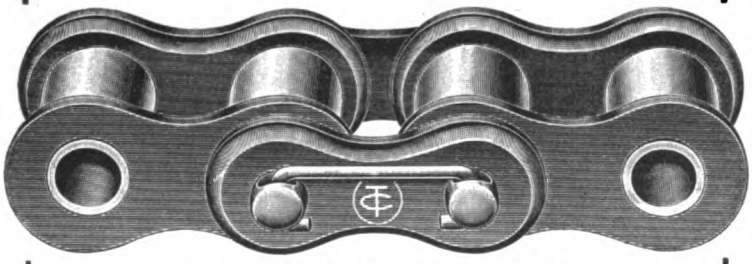

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Commercial Vehicles equipped with

The Edison Storage Battery

have established the lowest hauling cost records ever attained—whether per mile, per ton, per package or per year. Its advantages over other storage batteries are clearly defined.

1. The Edison has double the ampere hour capacity, double the mileage capacity of any other battery of equal weight. Or, equal capacity with *half* the weight—allowing great reduction in the weight of the vehicle and greater proportionate load capacity.

2. All of the battery troubles that put other storage batteries in the repair shop or out of business completely have no effect whatever on the Edison. Overcharging, instead of injuring the Edison, actually does it good. It is not injured by too rapid discharge or even by complete discharge. It may stand idle indefinitely without automatic discharge, deterioration or change of any sort. It is compact and rigid—built to withstand the most intense vibration and rough usage.

3. It requires infinitely less care than any other battery. No constant washings, no expensive renewals. The only care it requires is to keep the cells clean externally and filled with distilled water.

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Manufacturers of

Drop Forgings, Steel Tanks, Heaters, Smoke Stacks and Sheet, Plate and Structural Iron Work of Every Description

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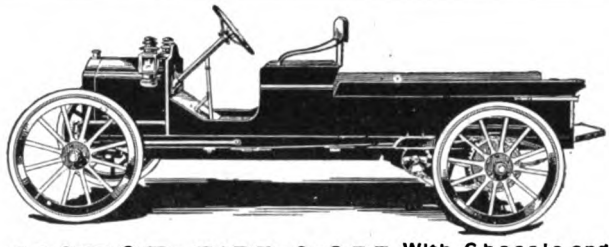
Western Drop Forge Company
Marion, Indiana



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$610

A cheap, reliable and efficient Motor-Wagon for delivery purposes.
Will do the work of a two-horse-and-wagon outfit and at less cost.
Simple to operate and is repair proof.
Reliable agents should write for unoccupied territory.

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The greatest and most rapid cooling ability with the least pounds of weight.
An average of one-half the wind resistance of any radiator made.
The maximum of strength with the minimum of weight.
The only radiators in the world which may be frozen with no danger of splitting the tubes.

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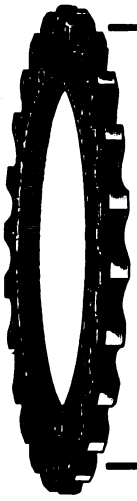

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Manufacturers of high grade roller bearings for all purposes.

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Honeycomb Truck Radiators

MADE BY

BRISCOE MFG. COMPANY,
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BEST AND CHEAPEST
ALL SIZES AND FOR ALL PURPOSES

AGENTS DESIRED

"K-B" UNIVERSAL JOINTS

KANT-BREAK
BEST FOR COMMERCIAL CARS
1000-LB. TO 10-TON TRUCK

All our Universals are made from Drop Forgings and are case-hardened throughout.
Unequalled for workmanship and finish.

Deliveries within two weeks from receipt of specifications.

THE KINSLER-BENNETT CO., Hartford, Conn.
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PRESSED STEEL
FRAMES
FOR TRUCKS

A. O. SMITH COMPANY
MILWAUKEE

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BABBITT—ALUMINUM—BRASS
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including all well known Babbitts, Aluminum Alloys, Brass and Bronze Compositions as well as all Zinc and Tin Base Metals.

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of any material, including Cast Iron, Bronze, Brass, rough or finished. Manufacturers of Automobile Parts, Water Pumps, Oil Pumps, Carburetors, Etc., Dies and Light Machinery.

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The crank shaft is of large diameter—a self contained oiling system supplied by a gear pump through the hollow crank shaft provides perfect oiling. The extra large bearings reduce friction to a minimum and increase durability.

ALL 4 CYCLE—IN 5 TYPES
3¼" bore, 5 " stroke, 4 cyl.
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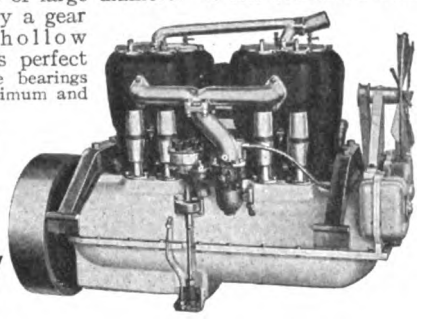
4½" bore, 5 " stroke, 6cyl.
4½" bore, 5½" stroke, 4cyl.
5½" bore, 7 " stroke, 4 cyl.

WISCONSIN MOTOR MFG. CO. Dept. 31
Milwaukee, Wis.



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"The Name That Stands for Quality in Commercial Car Construction"

Guaranteed by 40 years' experience in building Highest Grade Business Wagons and 8 years of Motor Car Manufacture.

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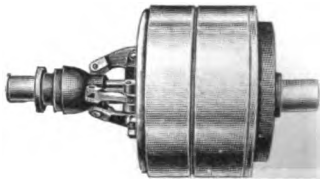

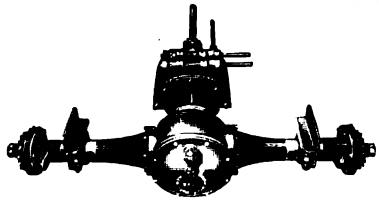

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MANGANESE, VANADIUM, NICKEL, CROME, HIGH AND LOW CARBON STEELS,

FOR MOTOR TRUCK CONSTRUCTION

Motor Truck Engineers, Designers, and Factory Superintendents are invited to submit blue prints and specifications.

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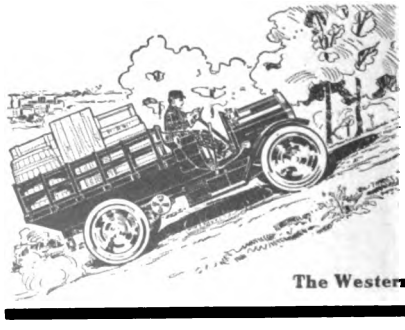
to the truck that places its reliance upon



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This is the motor that is built for service, speed and silent performance. It cuts your motor costs in half and doubles your efficiency. Write for the record of this motor and for list of power trucks carrying the RUTENBER

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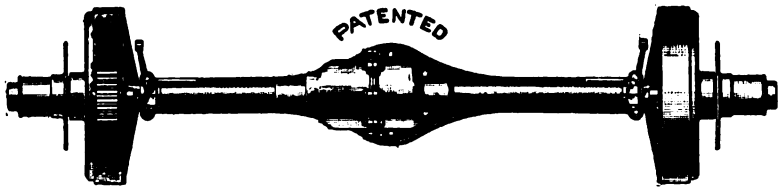
Size, 1500 lbs. to 3 tons.



Size, 1500 lbs. to 3 tons.

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Auto-Trucks, Fire Apparatus and Commercial Vehicle Springs
combining
MAXIMUM OF ENDURANCE with MINIMUM OF VIBRATION
Made to order of Special Heat-Treated Alloy Steel

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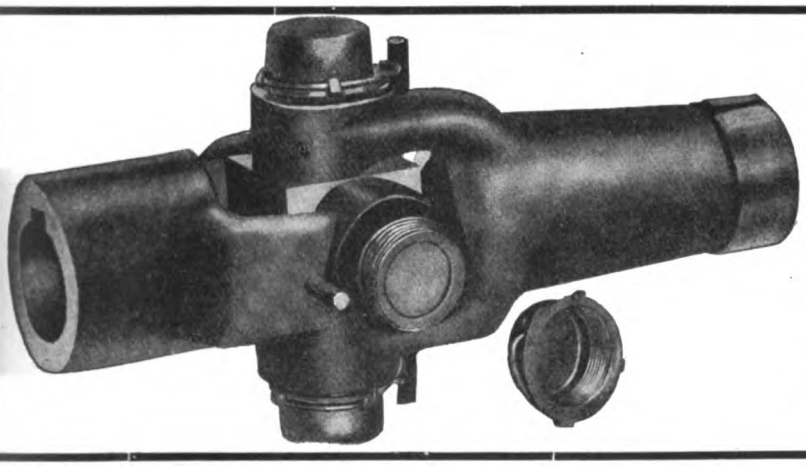

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Style A, made for all sizes of shafts up to 3 inches.

Strongest and most durable joint for motor trucks. Used for years as a regular equipment on many of the best makes of trucks.

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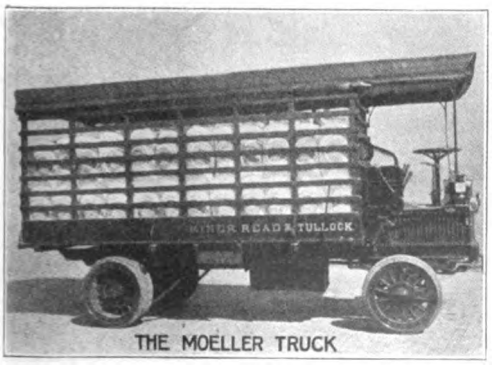

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Write for catalogue and literature today showing cost of operation and maintenance

Not a Better Built Truck in America

Manufactured and Guaranteed By
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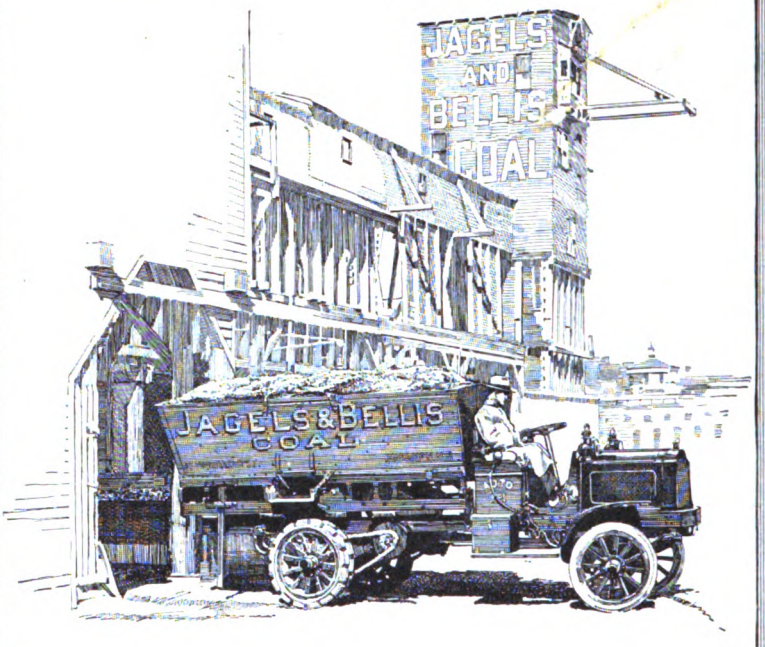

Packard trucks are used in one hundred and fifty-four lines of trade and in two hundred and thirteen different cities

Packard Motor Car Company, Detroit

Packard

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"Whitney" Keys and Cutters

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"The Woodruff System of Keying"

"Whitney" Keys are made in 114 sizes and are furnished in three grades of steel, as follows:

Regular Carbon Steel Keys
Regular Carbon Steel Keys, Case Hardened
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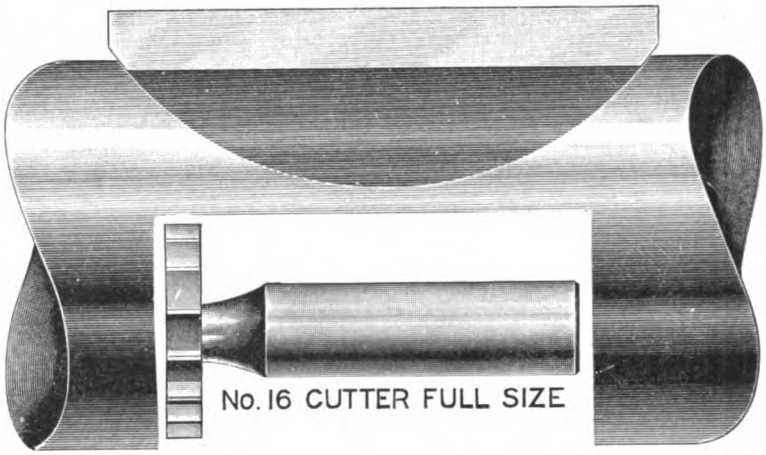
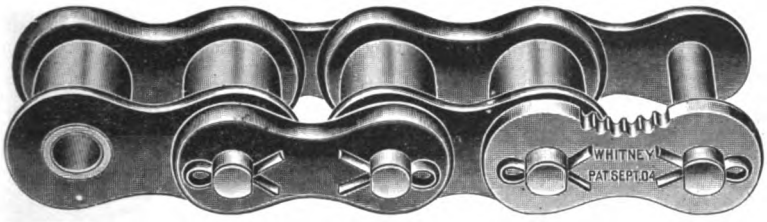
"Whitney" Cutters are furnished in Carbon Steel and High Speed Steel. We urgently recommend the use of the latter as they are far more efficient than Carbon Cutters if run at the proper speed, which in general, should be about twice the speed of Carbon Cutters.



The "Whitney" Cotter Detachable Chain



Used and highly recommended by the leading makers of commercial cars.

When making replacements try a "Whitney" and get acquainted with its merits.

Look For The Cotter Pins.

THE WHITNEY MFG. CO., - - Hartford, Conn.

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The Detroit Force Feed Oiler supplies only as much oil as each part of the engine requires.

It **forces** the right amount of oil to the place where it is needed just when it is needed.

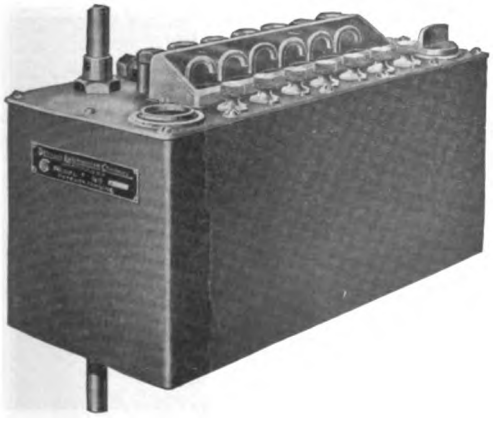
The rate of feed is governed by the engine speed. There is no possibility of waste. Regardless of changes in speed and differences in viscosity of the oil resulting from varying quality and temperature the Detroit Oiler always gives **exact** lubrication.

The Detroit Force Feed Oiler prevents excessive carbonization and smoke at the exhaust by preventing waste.

It eliminates the dangers resulting from carelessness and lack of knowledge because it is absolutely automatic.

The Detroit Force Feed Oiler guards against the excessive wear and expense which comes from faulty lubrication. It is insurance against inadequate lubrication and over lubrication at the same time.

The Detroit Force Feed Oiler makes for **guaranteed service.**



The Detroit Force Feed Oiler Is Simple

It has no complicated mechanism to get out of order. It supplies fresh, clean oil to the bearings and lengthens the life of every moving part.

There is a Detroit Oiler for **every** kind of truck. They are made in capacities from two pints to five gallons, with from one to thirty feeds. Pulley, ratchet or gear drive.

The Detroit catalog tells all about them—their many advantages in design and construction which have made the Detroit the standard gas engine lubricator.

Detroit Force Feed Oilers are furnished **as** standard equipment by many manufacturers of high grade commercial trucks. Others can furnish them when specified.

Write today for catalog P-67 and full information stating in what make of truck you are interested.

DETROIT LUBRICATOR COMPANY.

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Largest manufacturers of lubricating devices in the world.

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THE PIERCE-ARROW worm gear drive will outwear several sets of chains and sprockets—and this guarantee is behind it:

GUARANTEE

The worm wheel and worm shaft, generally known as worm gear construction, employed in the Pierce-Arrow Truck, are warranted to fulfill their functions for one year from date of shipment, under normal service.

Worm gear drive conserves much of the power lost in transmission by other means.

PIERCE-ARROW

5-TON MOTOR TRUCKS

THE PIERCE-ARROW MOTOR CAR COMPANY, BUFFALO, N. Y.

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No. 89. Chicago, April, 1912. Price 20 Cents.

THE POWER WAGON

There are six Alco Trucks in the service of the Simmons Hardware Co., St. Louis. Five of them are recent reorders.

ALCO
Motor Trucks

A Road Locomotive—All Steel

LIKE the new steel railroad coaches—or better still, the locomotive—Alco trucks can now be equipped with all steel bodies. Scarcely a stick of wood thus will be found above the wheels—the spokes of the wheels are of wood, because wood is resilient.

Bodies are steel; driver's compartment steel, as well as floorboards, footboards, seat, seat back, seat frame, radiator boards, and so on—built by the Hale & Kilburn Company of Philadelphia.

There is nothing left to burn, nothing to wear loose, rattle or squeak. Nothing left to mark the truck as belonging to the provincial or prehistoric era of the motor freight vehicle. The Alco Truck is now a locomotive—*a road locomotive*—with a factor of safety *25 per cent greater than in the average rail locomotive*.

Eliminating the wood in the Alco truck—or any truck—is like eliminating the wood in a railway coach. The life of the truck is greater. The truck is stronger. The truck is cleaner—neater—and the engineering is improved.

Time, also, is saved. By unscrewing eight accessible nuts, the entire portion of the truck above the power plant comes off instantly. It can be taken off leisurely in eight minutes; a good man can do it singlehandedly in five.

But this will seldom be necessary for the new Alco motor rarely needs attention. The valves are enclosed; the motor is dust proof; it runs as consistently as a fine watch.

The motor in an Alco truck in the service of the Adams Express Company of Philadelphia ran 144 hours without stopping—it was the week before Christmas, when traffic was heavy.

An Alco truck in the service of the United States Express Company of New York ran—without the motor once stopping—for 336 hours. It broke the Alco's previous world's non-stop record of 168 hours. These are actual *business* tests.

These new steel bodies will indicate to you the alertness, the progressiveness of the Alco builders. Catalog on request.

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Movers of the World's Goods since 1835

Capital, $50,000,000

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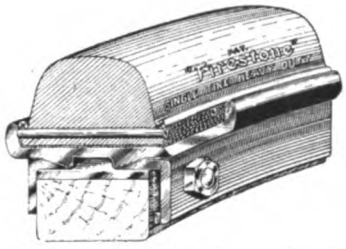
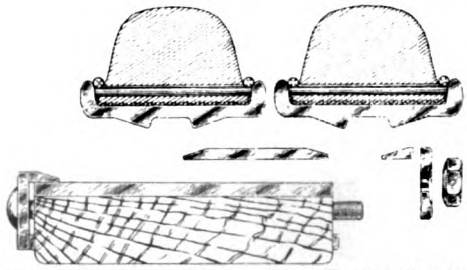
"Firestone"

TRUCK TIRES and RIMS

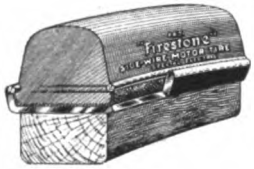
The *Only* Complete Line of Tires for Every Service—The *Only* Truck Rims for Quick Tire-Changing that have Passed the Experimental Stage

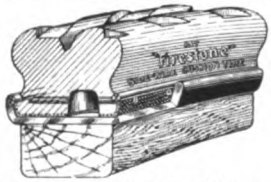
WE ANNOUNCE the addition of several heavy-service tires, completing a Firestone line of designs to exactly suit every type of car, size of load and condition of service —*and every tire a proven success.* On regular rims, or on Firestone Quick Removable Rims, for quick tire-changes *right on the spot.*



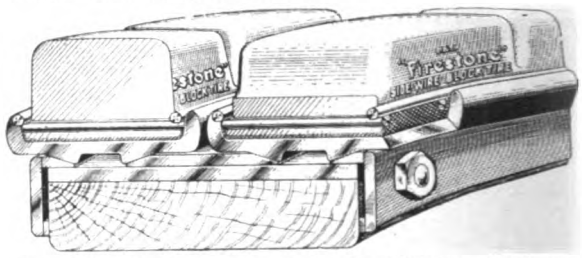


Single and dual Heavy Duty tire for resiliency. Economical in car up-keep. S. A. E. standards.
NOTE: Both dual tires can be taken off without removing the wheel.

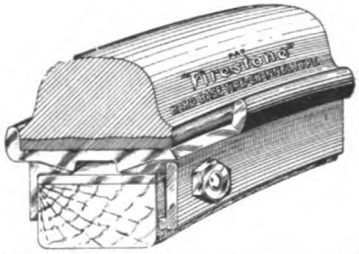




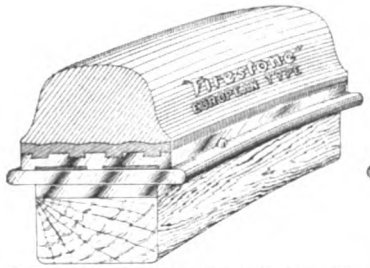
Cushion and Special Electric tires for Electric Pleasure Vehicles, Electric Trucks and Light Gasoline Delivery Wagons. Extremely resilient, and economical in current consumption. Rims for Cushion Electric tires are interchangeable with pneumatic rims. Special Electric tires made in Old standards to fit channel rims and in the S. A. E. Standards to fit channel and Quick Removable Rims.



Block tire for traction and non-skidding in heavy service. Economical in car up-keep. Old and S. A. E. standards.



Hard Base — channel type for heavy service. S. A. E. standards.



Hard Base—European type. Has a tough, resilient tread and a metal-and-hard-rubber base. S. A. E. standards only.

Many years of *undisputed leadership* in Quality, Design and Volume of Output have particularly qualified the Firestone company to offer this only complete line of *fully proven* tires and rims.

More than one hundred service stations throughout the United States.

WRITE FOR OUR GUARANTEES

The Firestone Tire & Rubber Co., Akron, Ohio

"America's largest exclusive tire and rim makers"

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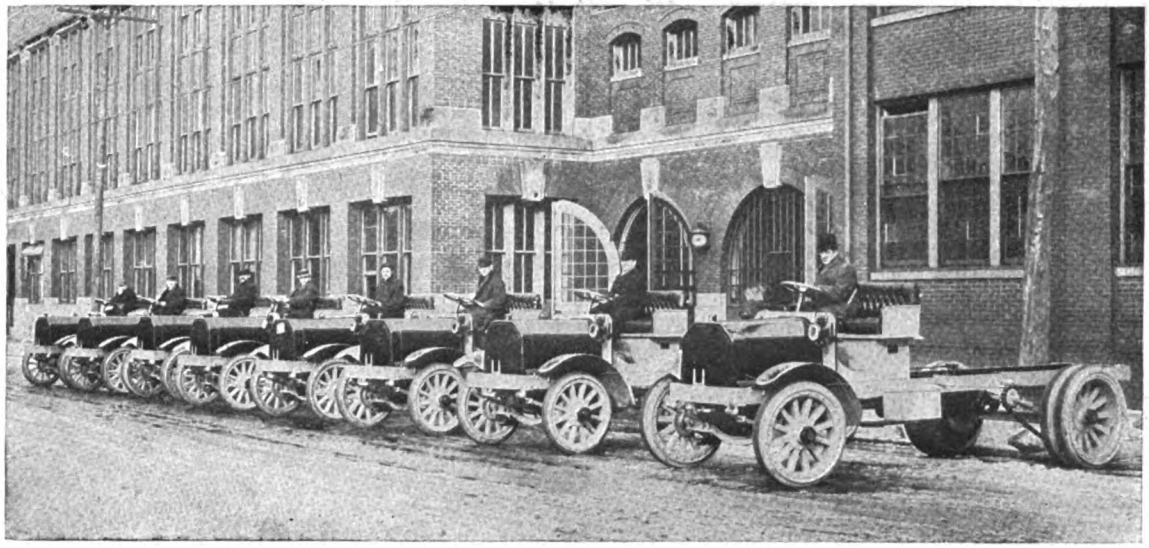

Eight of the sixteen Peerless Motor Truck chassis bought by the American Express Company, whose business demands uninterrupted service

THE American Express Company maintains a traffic-engineering department whose duty is to assure highest efficiency in delivery and transfer facilities.

It was after thorough mechanical investigation that this company bought its first five Peerless Motor Trucks. The uninterrupted service given by those trucks in every-day use has since led to the purchase of eleven other Peerless Trucks by the same company.

This and other instances show that Peerless Trucks are being bought rather than sold. And they are bought with assurance. One of the Peerless principles is to place Peerless Motor Trucks only where individual conditions point clearly to the user's profit.

Peerless 3-Ton 4-Ton 5-Ton MOTOR TRUCKS

TRUCK DEPARTMENT

The Peerless Motor Car Company

Cleveland

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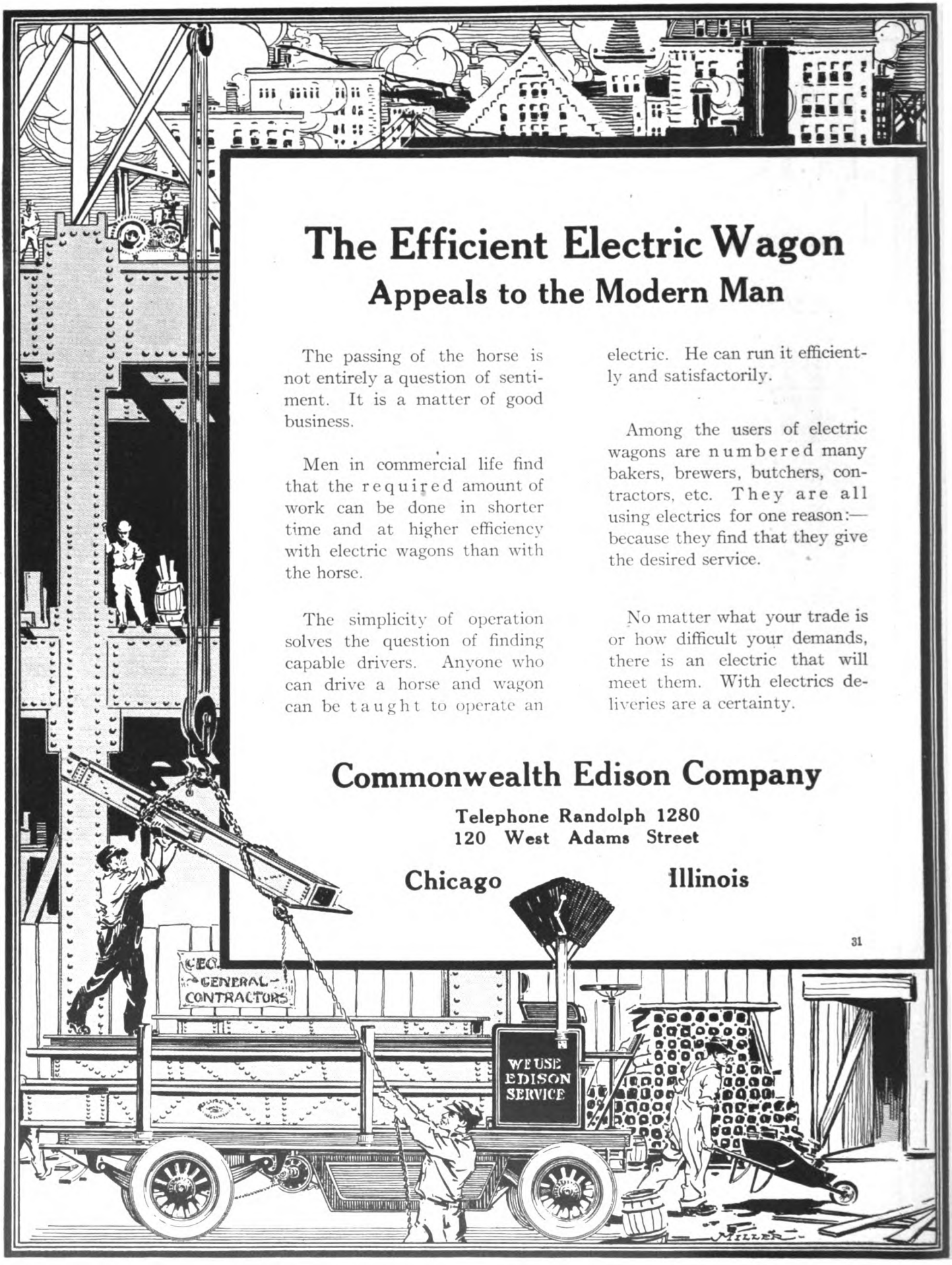

The Efficient Electric Wagon

Appeals to the Modern Man

The passing of the horse is not entirely a question of sentiment. It is a matter of good business.

Men in commercial life find that the required amount of work can be done in shorter time and at higher efficiency with electric wagons than with the horse.

The simplicity of operation solves the question of finding capable drivers. Anyone who can drive a horse and wagon can be taught to operate an electric. He can run it efficiently and satisfactorily.

Among the users of electric wagons are numbered many bakers, brewers, butchers, contractors, etc. They are all using electrics for one reason:—because they find that they give the desired service.

No matter what your trade is or how difficult your demands, there is an electric that will meet them. With electrics deliveries are a certainty.

Commonwealth Edison Company

Telephone Randolph 1280
120 West Adams Street

Chicago Illinois

31

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NOTED THE WORLD OVER

Motor CHASE Trucks

For Simplicity, Efficiency and Diversity of Usage

FIVE MODELS—1000 to 4000 lbs. CAPACITY. ALL STYLES AND BODIES

Chase Model L—Stake Body. Capacity 3000 lbs. Price $1825.

The great spring demand for **Chase** trucks as evidenced by actual orders in hand and dealers' reports is the best proof we have of the amazing popularity of the **Chase.**

The purposes for which those already ordered are to be put when delivered and the correspondence we are now having with prospective purchasers both here and abroad convince us that the **Chase** is being used in a greater variety of ways than any other truck.

Chase trucks are the ideal service type. Their staunch construction, ease of handling and economy of up-keep, for which they have always been noted, are reasons for **Chase** popularity and **Chase** repeat orders.

WRITE FOR CATALOGUE AND FULL INFORMATION

CHASE MOTOR TRUCK COMPANY

200 W. JEFFERSON STREET SYRACUSE, N. Y.

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Diamond
WIRE MESH BASE (SPLICELESS) TIRES

UNINTERRUPTED MILEAGE

is what makes the use of a motor truck profitable

UNINTERRUPTED mileage depends as much on the tires used as on the truck itself. So the difference between expense and investment in the use of a motor truck is often largely a matter of wise tire buying.

Motor trucks equipped with Diamond Wire Mesh Base Spliceless Tires are not an expense, but are, as a rule, an investment because of insured uninterrupted mileage.

Six years of constant use has proved that Diamond Wire Mesh Base Spliceless Tires as originally designed were correct in principle. Though the truck tire industry has seen many changes there has been brought to light nothing to warrant the slightest change of principle in Diamond Wire Mesh Base Tire construction.

The thoroughness that has made Diamond Pneumatic Tires the largest selling single brand of tires in the world for fourteen years, has also made the Diamond Wire Mesh Base Spliceless Tire the largest continuously used make of solid truck tire since its correct principle was worked out by Diamond engineers.

There are 54 Diamond Service Stations equipped to take care of Truck Wheels quickly and efficiently, insuring the users of tires uninterrupted mileage.

The Diamond Rubber Company

Akron, Ohio

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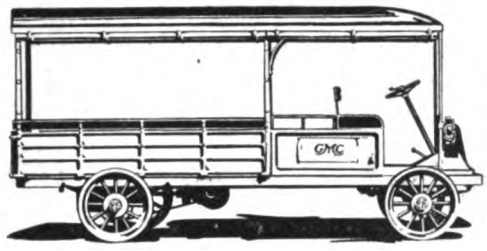
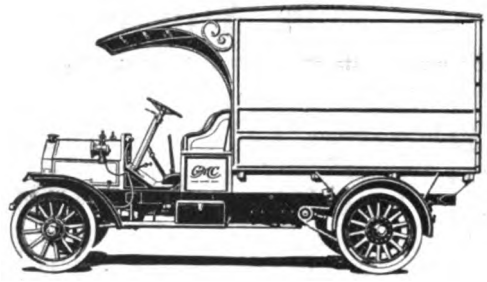
COMPLETE INSTALLATIONS GASOLINE GMC ELECTRIC COMPLETE SERVICE
TRUCKS



ELECTRIC TRUCK—EXPRESS BODY
Model 3—3000 lbs. Capacity. Price, Chassis Only, $1700.
Batteries and Bodies Optional.



MODEL V—PANEL BODY
Gasoline—1 Ton Capacity. Price, Chassis Only, $2300.

Ability Stability Reliability

Those are the cardinal points that should determine the selection of motor trucks. The manufacturing *ability* which answers all question as to design and quality in construction. The *stability* of the organization which insures permanency of the manufacturer. The *reliability* —which guarantees satisfactory operation of the truck and careful service and co-operation.

GMC Trucks are the product of the unequaled facilities of General Motors Truck Company factories, complemented by an unexcelled engineering staff, and founded upon ten years' experience in the building of gasoline and electric commercial cars.

General Motors Truck Company, through its association with General Motors Company, gives assurance of permanence by ample capital, competent management, and the standing of its products. This manufacturing, engineering and financial strength and resources are behind every GMC Truck. Service, lasting, economical, and efficient, is thus guaranteed to every user.

A distinct service department is maintained for prompt repair, replacement, overhauling, adjustment or any other assistance needed by the GMC Truck owner to realize the fullest return from his investment.

This company is the only truck manufacturer making both gasoline and electric trucks. Our recommendations as to which power is better for any given work will be made without bias toward either gasoline or electricity. The GMC line comprises capacities of 1000 lbs. to 6 tons, and in gasoline models both the motor-under-hood and the motor-under-seat types. We are thus in a position to meet any requirement in motor transportation. We will make an analysis of your delivery problem without charge or obligation.

Correspondence from prospective purchasers and dealers is invited.

GENERAL MOTORS TRUCK COMPANY

DETROIT, MICHIGAN

Branches: New York, Chicago, Boston, Philadelphia, Kansas City, Detroit

Please mention the "Power Wagon" when writing to advertisers.

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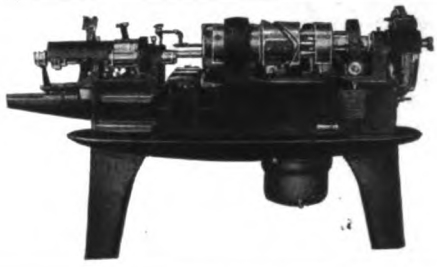
Capacities: ¼ inch to 6¾ inch

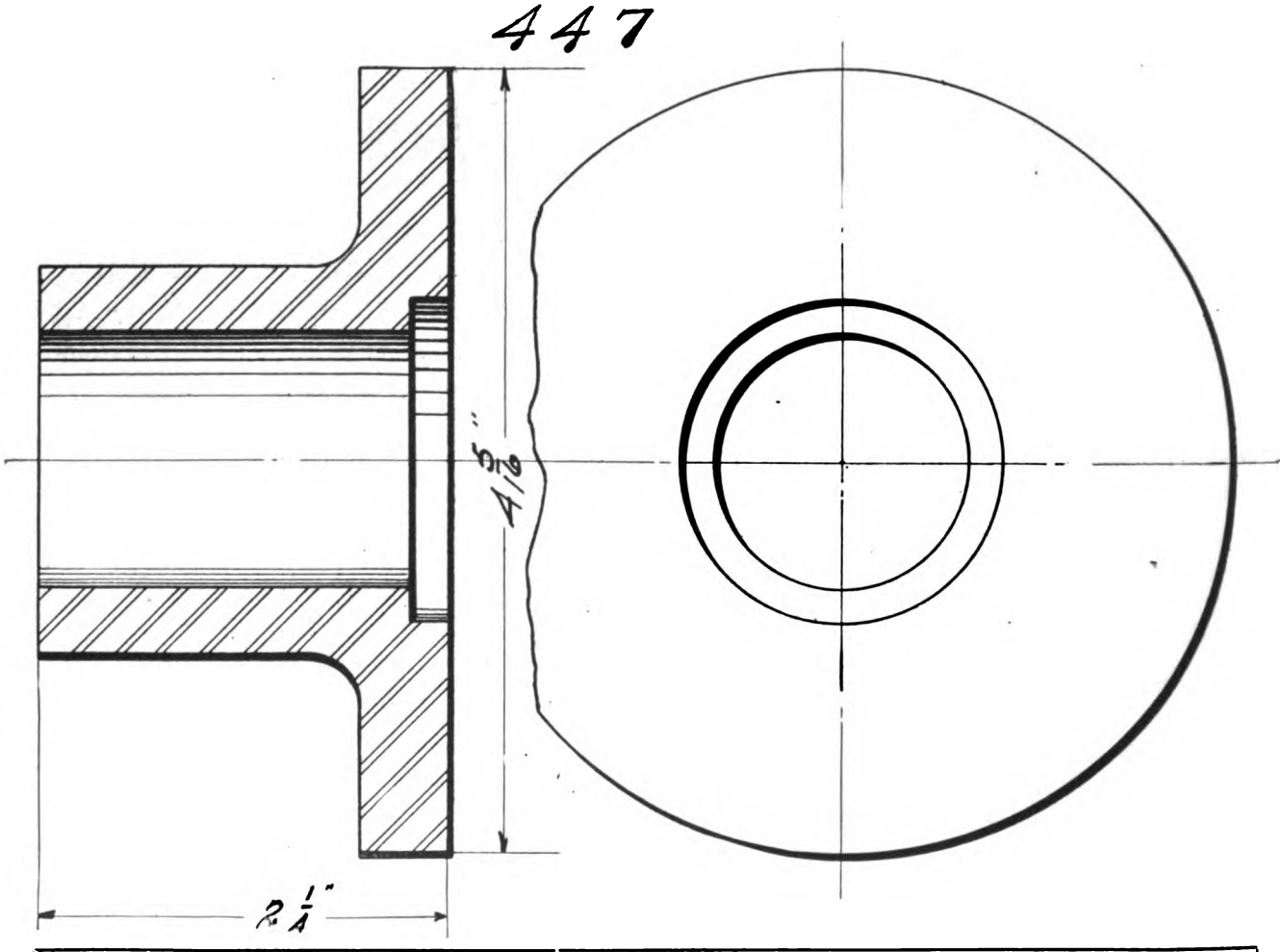
The Pre-eminence Of The Cleveland Is Indisputable

Operating Expense One Mill a Minute



Your Overhead Charges Added to the Above Will Give You the Exact Cost Per Piece

Results like the piece shown herewith prove that it pays to install Cleveland Automatics. Every day you delay in this matter you are losing money. Why not investigate **now?** Write us for a copy of our latest catalog—the book that woke 'em up.



Piece No. 447. Material, Chrome Nickel Steel; made on a 6" Cleveland Automatic Turret Machine; time, 28 minutes. Send in samples or drawings; we will send you complete specifications explaining outputs, cost of machines and tools, etc., etc.; capacities of our machines, ¼" to 6¾".

Cleveland Automatic Machine Company

Eastern Representative
J. B. Anderson, 2450 North 30th Street, Philadelphia, Pa.

Cleveland, Ohio., U. S. A.

Western Representative
Herbert E. Nunn, 562 Washington Boulevard, Chicago, Ill.

Foreign Representatives—Chas. Churchill & Co., London, Manchester, Birmingham, Newcastle-on-Tyne and Glasgow. Messrs. Schuchardt & Schutte, Vienna, Berlin, St. Petersburg, Stockholm, Copenhagen and Budapest. Alfred H. Schutte, Cologne, Brussels, Liege, Paris, Milan and Bilbao.

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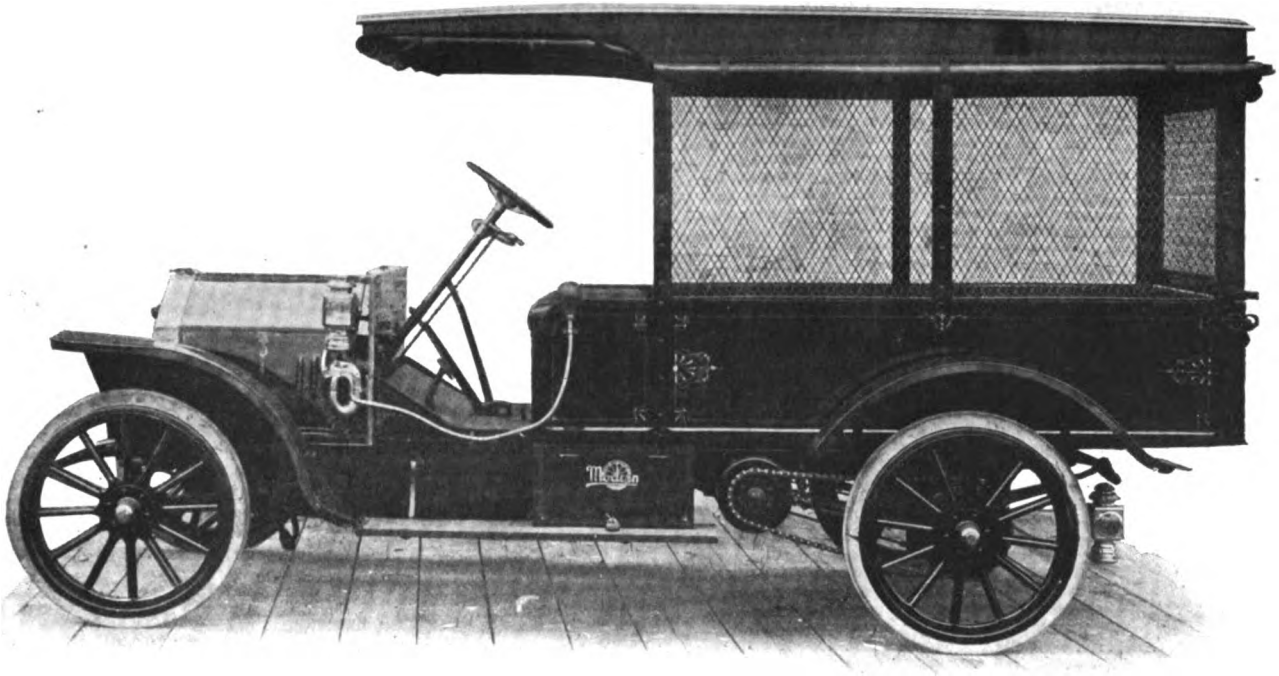
The True Value of a Motor Wagon Depends on its Freedom from Interruption of Service

The Modern is built on that idea

Tested in many lines of business----Strongly endorsed by users in every section

EXCEPTIONAL QUALITY OF DESIGN AND APPEARANCE



Capacity 1000-1300 Lbs. - - - Chassis, $1200
1500-2000 Lbs. - - - Chassis, $1600

PROMPT DELIVERIES

Dealers of highest standing are invited to inquire for territory, giving sales and service facilities.

Write for catalog

The Bowling Green Motor Car Company

Bowling Green, Ohio

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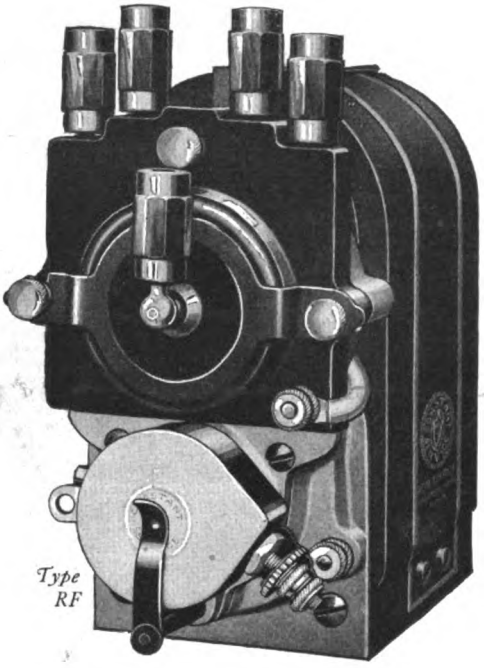
REMY


Type RF

Trucks and Tractors

Present Special Problems

Solid rubber or steel tires produce shocks that are fatal to the delicate mechanism of the ordinary magneto. The low speed required in heavy hauling also demands a non-failing white hot spark under continuous throttling down. The answer is the

Remy Heavy Duty Magneto

(TYPE RF)

It combines simplicity with utmost efficiency. There are no revolving wires, no troublesome wiping contacts, no delicate springs to weaken and break; no frail parts of any kind; no intricate adjustments. Two laminated steel inductors revolve around a central stationary winding, generating the current, which is carried direct by wire from the winding. Highest grade ball bearings; chrome, nickel steel, the best platinum obtainable; indestructible bakelite insulation.

The RF is proof against vibration, abuse, dirt, water, oil and wear. It gives the same constant white hot spark at full advance or full retard. Starts on a quarter turn.

As sturdy mechanically as it is efficient electrically.

Consider Remy Service

The country-wide Remy Service, with its trained ignition experts, is on the job all the time to keep your trucks free from ignition troubles.

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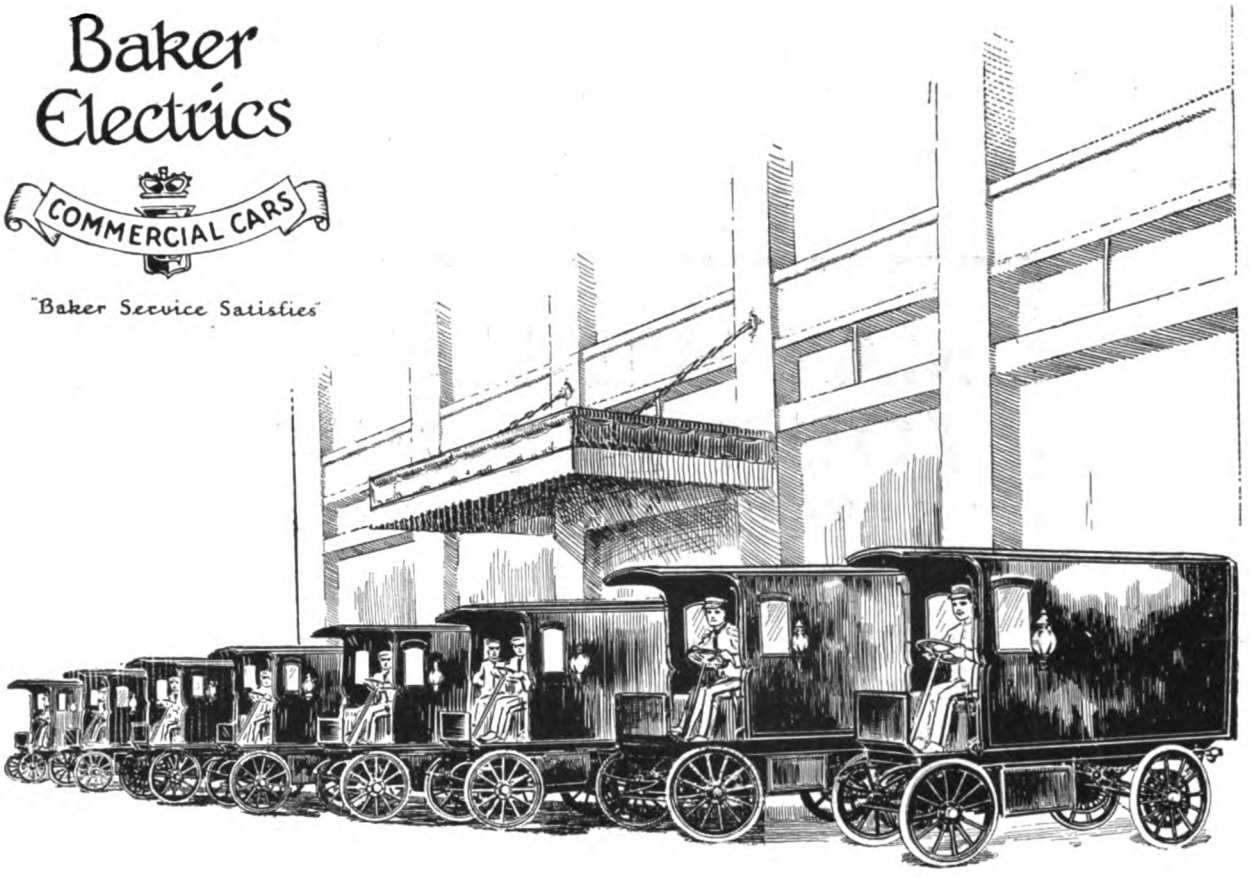
Baker Electrics

COMMERCIAL CARS

"Baker Service Satisfies"



Package Delivery Cost Reduced Over 50% By Baker Electric Cars

(*Some Actual Figures*)

Baker trucks have reduced the cost of parcel delivery for several big department stores and dry-goods concerns to ***less than four cents*** per package delivered. During December 1911, the month of holiday rush, eight Baker delivery wagons in the service of a large department store made an average daily mileage of 35 miles, an average daily delivery of 247 packages, at a ***total cost of 2.7 cents*** per package.

This company maintains a Service Efficiency Bureau, in charge of a well known transportation engineer, for the purpose of solving delivery problems for prospective users of power wagons. This service is afforded without charge and includes thoroughgoing analysis of any delivery situation as well as the making up and furnishing of cost figures. For particulars address

The Baker Motor-Vehicle Company Commercial Car Department

69 West 80th Street, Cleveland, Ohio **Dealers in Leading Cities**

Oldest and Largest Manufacturers of Electric Vehicles in the World

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MAY WE HAVE YOUR LAYOUT

OF BEARING INSTALLATION?

We can save you money, time and trouble, —in other words, show you a short cut to satisfactory bearing installation. ¶ The successful use of New Departures in 60 per cent of the motor cars manufactured in this country proves that the quality of this American made bearing has been well established. ¶ This fact also constitutes a good reason why you should send us your lay-out and give our engineering and sales departments an opportunity to place our proposition squarely before you. :: ::

Our engineering department is highly specialized, not only for the production of superior ball bearings, but for giving to the trade expert co-operative service. ::

THE NEW DEPARTURE MFG. CO.

BRISTOL, CONN.

1016 Ford Bldg. DETROIT, MICH.

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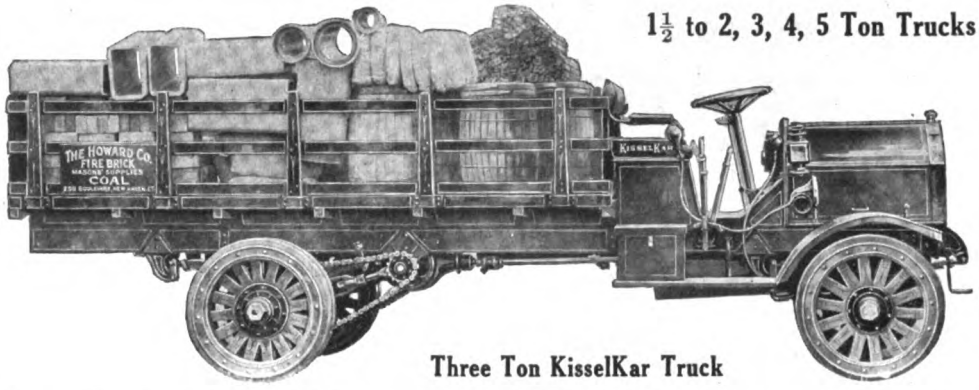
KISSELKAR TRUCKS



1½ to 2, 3, 4, 5 Ton Trucks

Three Ton KisselKar Truck

Trucks, Delivery Wagons, Ambulances, Fire Department Apparatus, Etc.—All Types of Bodies

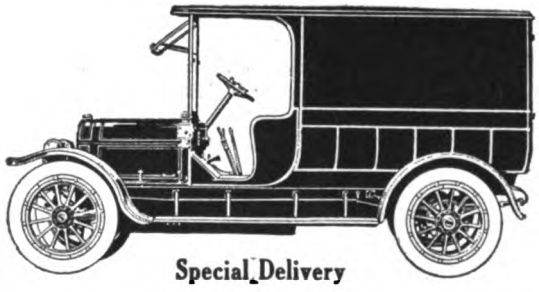
Economical power haulage depends on getting the right type vehicle of the right capacity, for the particular service in which it is used. The KisselKar Line includes the right commercial vehicle for every commercial need—from the small, speedy delivery wagon in retail service to the heavy duty long distance truck.

Economy, reserve power, excess capacity

Road competitions have demonstrated KisselKar Trucks to give service on from 15% to 50% less fuel than average trucks. They have the structural strength and are powered to handle loads in excess of capacity when business makes it necessary. The KisselKar lock on the differential prevents stalling when one drive wheel slips in mud, or ice, or snow, and by spinning rapidly robs the other wheel of power; a foot lever locks both rear wheels together, the wheel on solid ground supplying the traction.

Delivery Wagons

The KisselKar line of delivery wagons affords a proper body and wagon for every condition of service—the flexibility of control makes them adaptable for service in city traffic—the tire and fuel economy make them practical for suburban or country service. The simplicity of the motor and economy of fuel which they have in common with the KisselKar Trucks result in lower delivery costs, while their speed increases the radius of delivery.



Special Delivery

Write for KisselKar Catalog

Gives cost data between power and horse haulage and delivery; completely describes and illustrates the full KisselKar Commercial Line.

KISSEL MOTOR CAR CO. 158 KISSEL AVE., HARTFORD, WIS.

Branches in New York, Boston, Chicago, Kansas City, Denver, Minneapolis, San Francisco, and all other principal cities

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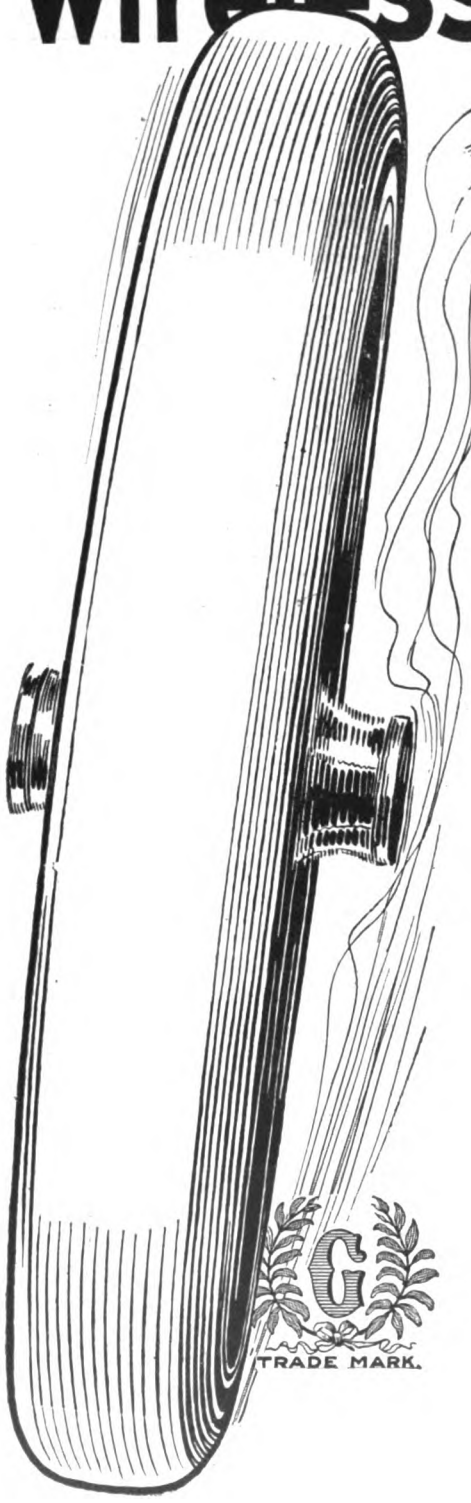
GOODRICH
Wireless Truck Tire



Every month shows a big number

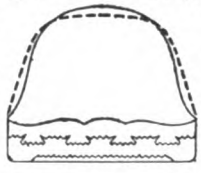
of other makes of truck tires *replaced* by the Goodrich Wireless. In August, 203 equipments were replaced by the Goodrich Wireless Tire; in September, 185; in October, 190; in November, 158; in December, 133; in January, 140. Bear in mind that these are experienced truck tire users.

Their selection of the Goodrich Wireless was guided wholly by the records of different tires on their own trucks.

Your choice of truck tires can be safely based on their experiences, and on the reasons for the results which led them to choose the Goodrich Wireless; such as

The Goodrich Wireless method of fastening tire to rim; absolutely positive, thus eliminating sudden break-down and "dead time" for repair or replacement during life of tire.

The Goodrich scientific shape of tire—giving, under load, greatest possible traction and resilience, without distortion.



The remarkable toughness of the rubber used and high quality of the whole equipment.

Records in the hands of truck users show that Goodrich Wireless Tires stay on and regularly average 10,000 miles and upwards of uninterrupted service. More than likely we have some reports of the Goodrich Wireless on trucks used by firms in *your* particular line of business. Shall we send them to you?

The B. F. GOODRICH CO., AKRON, Ohio.

Largest in the World

Branches in the Principal Cities **Wholesale Ti... Depots Everywher...**

Please mention the "Power Wagon" when writing to advertisers.

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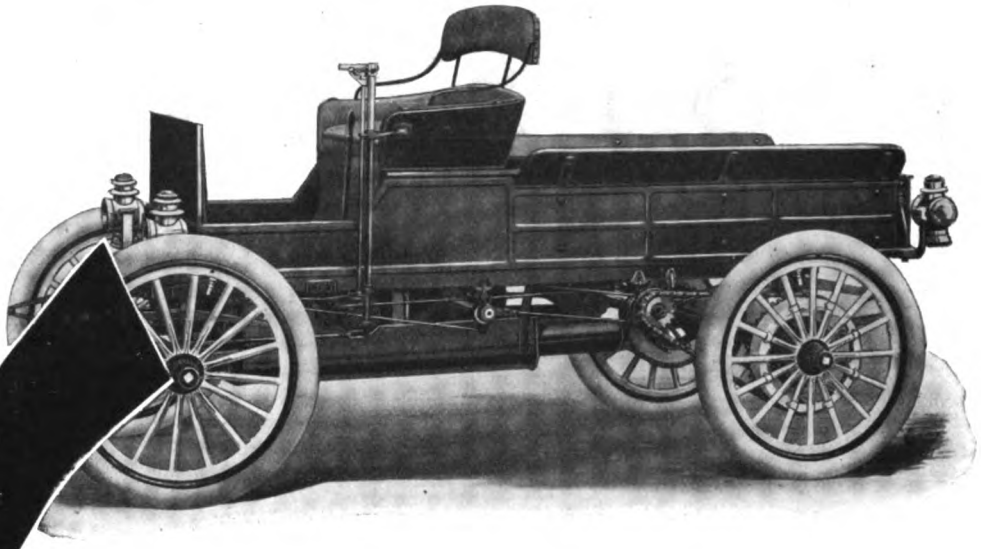
LINCOLN MOTOR WAGONS

Rank First Among All Light Delivery Cars



NO TIME LIMIT ON THE GUARANTEE

Such a Guarantee inspires confidence.

Built with a thorough knowledge of light motor wagon requirements.

Strong construction **Reliable service**
Small up-keep cost **Large tires**

$575.00 to $785.00

500 Pounds to 800 Pounds Capacity

Open or panel top bodies. Solid or pneumatic tires.
We want some good agents in open territory.

Write for Terms.

Lincoln Motor Car Works

1341 W. Harrison Street
CHICAGO, ILL.

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SHELDON

One-Ton Equipment

IT'S READY!

Consists of

Front Axle, I-Beam style, with spring pads forged integral.

Rear Axle, rectangular shape, with integral spring pads, brakes and radius rods.

Jack Shaft with Transmission.

Springs, and all necessary brackets, shackles, clips, etc.

This material is thoroughly tried out, and you can have a complete truck on the market in short order. What we offer you here has been tried and tested, not by the user alone, but by ourselves. Let us send Bulletins on all this material.

SHELDON AXLE CO.

WILKES-BARRE, PA.

Chicago Branch:
68 East 12th Street

Detroit Branch:
1215 Woodward Ave.

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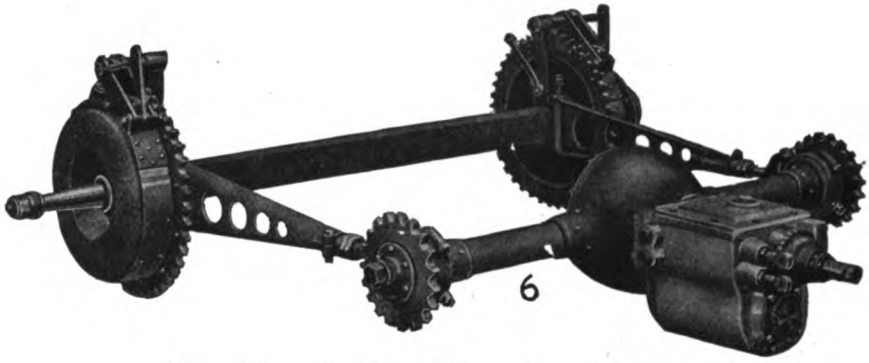
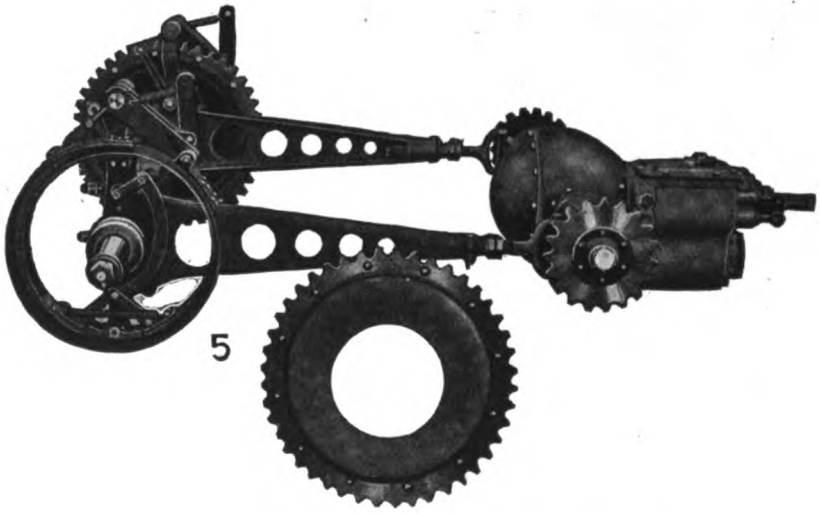
SHELDON

FRONT AXLE No. B-129

One Ton Equipment, D-13



Brakes D-132, Jack Shaft TD-130, Rear Axle B-139.



Same equipment showing brake drum and sprocket removed.
All shown on Bulletins. Mailed free on request.

SHELDON AXLE COMPANY

WILKES-BARRE, PA

CHICAGO BRANCH: 68 East 12th St. **DETROIT BRANCH: 1215 Woodward Ave.**

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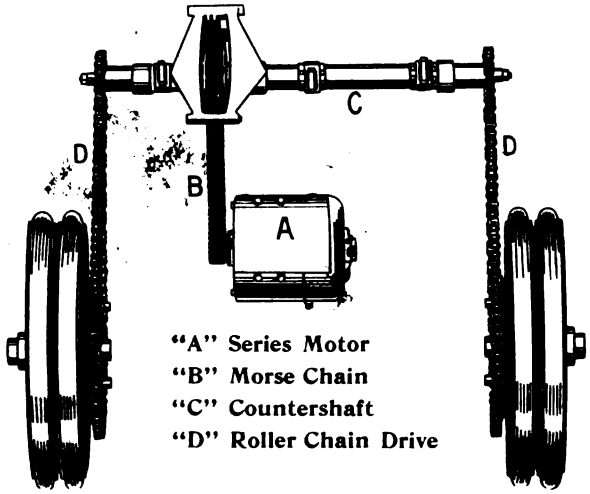
G. V. Electric Trucks

SIMPLICITY——STANDARDIZATION



"A" Series Motor
"B" Morse Chain
"C" Countershaft
"D" Roller Chain Drive

¶ This is all there is to the G. V. Power Plant. Compare it with the power plant of non-electric trucks. One *rotating* part against numerous *reciprocating* parts. No gear changing—no clutches. *No small parts to wear out and break on the road.*

¶ All of the 6 G. V. models are *standardized* and all parts of each model are *interchangeable* and *accessible.*

¶ Do you wonder that the G. V. Electric has the lowest maintenance cost of any commercial vehicle made?

¶ 750 lbs., 1000 lbs., 2000 lbs., 2-tons, 3½-tons and 5-tons capacity.

Write for catalog 72 and other data.

GENERAL VEHICLE COMPANY

Works and General Offices, LONG ISLAND CITY, N. Y.

New York:	Boston:	Philadelphia:	Chicago:	St. Louis:
505 Fifth Ave.	84 State St.	Witherspoon Bldg.	The Rookery	Wainwright Bldg.

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THE POWER WAGON

No. 89. CHICAGO, ILL., APRIL, 1912. No. 89.

Issued first of each month by THE POWER WAGON PUBLISHING COMPANY, 332 South Michigan Avenue, Chicago.

WALTER WARDROP - President and General Manager
HENRY FARRINGTON - - - Editor
F. F. BARNET - - - Associate Editor
H. L. HISCHE - - - Eastern Representative

SUBSCRIPTION RATES
One Year (Domestic) - - $2.00
One Year (Foreign) - - - 3.00

EASTERN OFFICE
322 Thoroughfare Bldg., 1777 Broadway
New York City

ADVERTISING RATES UPON APPLICATION

Advertisers' copy must be received not later than the 10th of the month preceding date of issue when proof is to be submitted.

Entered as second-class matter December 2, 1907, at the Postoffice at Chicago, Ill., under the Act of Congress on March 3, 1879.

Motor Wagon Speeds.

Present Users, as Well as All Makers, Should Have a Voice in the Matter.

THE QUESTION of how fast one should operate a motor wagon of given load rating is too important and too involved to permit of cursory discussion and hasty decision. Therefore the recommendations on motor wagon speeds, adopted by the National Association of Automobile Manufacturers after a convention held in New York on March 4 and 5 last, should be considered rather as a praiseworthy attempt to rectify existing abuses and to promote intelligent criticism and discussion than as an unequivocal and final ruling on this most ticklish of all motor wagon problems.

* * *

Convention Not Truly Representative.

This is all the more certain when one considers that there were present at the convention only 40 members, representing but 28 of the 400 odd American motor wagon manufacturers. And of these 28 makers only 7 or 8 at most could be even remotely considered as making machines "of all load ratings." Therefore, even making due allowance for the fact that among the members present there were to be found several who are deservedly acknowledged as experts in motor wagon practice, it would not be reasonable to suppose that 28 concerns could formulate practice that would be acceptable to the hundreds of other manufacturers, not to mention the thousands of owners who are operating the 25,000 or more motor wagons now employed in this country. So that while most people will readily admit that the speeds recommended by the N. A. A. M. are eminently safe and sane, and that they would probably form a good guide for future manufacture in the majority of cases, no one could make the unqualified assertion that they would apply even fairly closely to the thousands of machines already in use.

* * *

The N. A. A. M. Speed Table.

The speeds recommended at the convention and formally approved by the executive committee of the N. A. A. M. on March 6 are as follows:

Load Rating.	M. P. H.	Load Rating.	M. P. H.
½ ton.....	16	4½ tons.....	9½
1 ton.....	15	5 tons.....	9
1½ tons.....	14	6 tons.....	8
2 tons.....	13	7 tons.....	7
2½ tons.....	12	8 tons.....	6
3 tons.....	11	9 tons.....	5½
3½ tons.....	10½	10 tons.....	5
4 tons.....	10		

* * *

Suitable and Economical Speeds.

It is logical to assume that the most suitable speed for operating a motor wagon of given load rating is the speed at which the machine is most productive and economical in a given service under stated conditions.

As long ago as October, 1906, the "Power Wagon" made the following assertion: "Under ordinary condi-

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tions of doing business, 16 miles an hour would be a decidedly economical rate of travel for a delivery wagon of 500 pounds' capacity if the frame and body are suitably suspended and the wheels are adequately equipped with rubber tires. A well designed 1 ton wagon can with economy travel at 12 miles an hour, a 2 ton vehicle at 10 miles an hour, a 3 ton machine at 8 miles an hour, and a 5 ton machine at 6 miles an hour."

It will be noticed that the N. A. A. M. speeds are from 25 to 50 per cent in excess of those that were considered to be economical 5½ years ago, so that, taking into account the improvements in design that have taken place during this comparatively long period of time, the association's speeds are probably not excessive—"under ordinary conditions of doing business."

* * *

Relation of N. A. A. M. Speeds to Existing Practice.

But before attempting to define what this somewhat ambiguous phrase may mean when tied down to particular cases, it will be interesting to consider what relation the N. A. A. M. speeds may have on existing conditions.

The most obvious conclusions to be derived from a casual glance at the N. A. A. M. speeds are that they conform quite closely with those suitable for solid rubber tires, and that they are little if any higher than the speeds of electric wagons, which, although comparatively low, have proved decidedly economical in practice.

While this may be productive of good in particular cases it may prove quite a hardship in others. Certain gasoline motor wagon makers, whose machines are giving a very good account of themselves in commercial service, supply optional tire equipment according to the needs and desires of their customers. One reputable concern makes a 3,000 pound machine for which a road speed of 15 miles an hour is recommended for solid rubber tires, and 25 miles an hour for pneumatics. Another maker of a successful 3,000 pound model advises 15 miles an hour for solids and 28 miles an hour for pneumatics. At least 18 models of 1 ton capacity or less are designed by their manufacturers for a normal road speed of 20 miles an hour or more. Six of these are for 25 miles an hour or more.

These are not the maximum road speeds, it must be understood, but those recommended by the makers themselves for normal operation of their machines—presumably for the most economical results, all things considered. In many cases the maximum road speeds at which these motor wagons are capable of operating are upwards of twice the recommended "normal road speeds."

Thus it will be apparent that the limitation of motor wagon speeds to those recommended by the N. A. A. M. might result in losing two of the most important advantages of some thousands of at least the lighter classes of motor wagons now in use in this country, viz., the high speed capacities of their engines and the shock absorbing qualities of their pneumatic or cushion tires and their specially designed spring suspensions.

* * *

It's Late In the Day to Formulate Speed Practice.

Had these recommendations been made six or seven years ago, before the motor wagon had attained the widespread application and use of the present day, the problem would not be so perplexing. But to attempt at this late day to formulate speed practice by bare recommendations without many qualifications—to which reference will later be made—is only to make confusion worse confounded. That is why the careful student of the motor wagon would have appreciated from the N. A. A. M. some indication of how the conclusions were arrived at and how they must necessarily be modified to suit existing practice and specific local conditions.

* * *

What Is the Most Economical Speed?

This brings one to the discussion of what is the most economical speed for a machine of given load rating in a particular service and under given road and traffic conditions. And it will immediately be apparent that business, road and traffic conditions are so various and changing that the "most economical speed" for, say, a 3 ton motor wagon in department store package delivery service in a flat city like Chicago will not be the same as that for a similar machine used for hauling lumber up and down the hills of Pittsburgh.

But are we really justified at this transitory stage of our knowledge of motor wagon administration and operation in considering what is really the most economical speed, or the highest permissible speed, at which a given machine may be driven? Is it not more to the point, now and for many years to come, to consider by how large a margin we are content to beat the horse in economy, possibly taking into account the increased radius of delivery and collection of freight, the necessities for meeting competition of other houses in the same line of business, and so forth?

When this is the attitude taken, the problem settles down to a question of individual bookkeeping and the exigencies of a particular situation. And at this point it is apparent that the views of the user are of as much importance as those of the manufacturer, if not more so.

* * *

Two Opposite Examples of Motor Wagon Economy.

For example, a merchant in normal times may be making a profit out of his motor wagons, as compared with horses, by running them on a schedule which calls for an average speed of 10 miles an hour, when the maximum speed capacity of the machines may be 20 miles an hour, and the "normal road speed," as recommended by the maker, 15 miles an hour. By adopting this procedure he may find that the economy effected in the tire account alone more than offsets the other increased expenditures, considering the kind of territory he has to cover and the nature and volume of business he is doing. Under these conditions, when the rush season comes on, he has a potential increased speed of 5 miles

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an hour to draw upon and still not exceed the maker's "normal road speed," and in very particular cases—as during the Christmas shopping week—he may find it profitable to push his machines to the limit of their speed capacity for a few days, if the extra profit from the increased volume of business thus made possible will more than pay for the additional wear on the tires and the increased deterioration of his machines.

Another merchant might find in his case that it is more economical not to conserve his motor wagon investment, but always to obtain the greatest possible service of his machines without regard to the increased cost of upkeep and maintenance. If he has to pay extremely high garage rent and is compelled to employ high priced drivers he may find it decidedly economical to buy high speed machines and literally run them to pieces in a year or so, being convinced that the increased profit derived from such service (under his particular and peculiar conditions of doing business) will prove more than sufficient to pay for new equipment when the old has ceased to be productive and serviceable.

These are opposite extremes, probably neither of them so rare as to be excluded from consideration, and between them there are many other particular cases to which no grand law of generalized averages will even approximately apply.

* * *

British Speeds Conform to Law From the Very First.

Up to the time of the N. A. A. M. decision on March 6, 1912, the speed question for motor wagons had not received other than local attention in this country. It is necessary to take the experience of foreign countries before one can find a parallel or precedent. Great Britain is probably the best example to be found abroad.

In the "dark ages" of mechanical road haulage in Great Britain—that is, before the passage of the Locomotives on Highways Act of 1896—a power wagon for road service was compelled by law to crawl along at a snail's pace, preceded by a man waving a red flag to warn horse traffic and pedestrians of the approach of the "terrible monster." Naturally, despite the inventive genius of the Smeatons, Watts, Stephensons and other mechanical prodigies which Great Britain supplied liberally to the world in the nineteenth century, the vogue of motor road transport was practically dead in the "tight little isle" across the ocean.

The passage of the act of 1896, however, caused nothing short of a revolution in mechanical road haulage in Great Britain. This piece of legislation permitted a speed of up to 14 miles an hour for "light locomotives" (motor road vehicles, in other words) which did not weigh, without load, more than 3 long tons (6,720 pounds), exclusive of their fuel, water, storage batteries (in the case of electric vehicles), or the like. The act further permitted the use of one trailer, providing the combined weight of tractor and trailer, without fuel, etc., or load, did not exceed 4 long tons (8,960 pounds).

The limit of 3 tons, however, was later found to be inadequate, and the historic act of 1896 was superseded by the Heavy Motor Car Order which came into effect in March, 1905, and continues in force until the present day. This order deals with power wagons of 2 long tons (4,480 pounds) up to 5 long tons (11,200 pounds), unladen, the latter being the heaviest type of machine permissible, and for all of these, if fitted with tires of rubber or soft material, it stipulates a speed limit of 12 miles an hour. But if hard tires, as of the metal or wood variety, are used, the speed is restricted to 8 miles an hour for machines weighing between 2 and 3 long tons, unladen, and to 5 miles an hour for those weighing from 3 to 5 long tons, without load.

* * *

Why We Cannot Follow British Practice.

It must not be assumed for a moment that the British precedent can profitably be followed in this country. In the first place, power wagon manufacture in Great Britain has been built up to conform to these statutes from the very inception of the motor wagon industry. In America we have already many more machines in actual service than there are in Great Britain, but our vast motor wagon investment of $70,000,000 or more has been made without the governing action of any more or less beneficent or coercive legislation. Thus the cases are practically reversed—England's power wagons conform to the laws; our laws must be made to conform to the motor wagons, or at least to tolerate those in use.

Still there is this very palpable fact to consider. If in Great Britain the motor wagon of 2 tons or more dead weight (which is practically equivalent to the same load rating) can establish its economy, as it unquestionably has done, under a maximum speed restriction of 12 miles an hour, the machine can do pretty much the same thing in America or any other country. And this is the lesson we have to keep in mind. If we do this, we will be spared the unedifying spectacle of a 5 ton power wagon rushing along over a bumpy road at the rate of 15 miles an hour, either because of the ignorance or callousness of its driver or because the owner erroneously believes it is necessary to do so in order to obtain the maximum economy out of his motor wagon investment.

* * *

Necessity for the Motor Wagon Users' Association.

All of which brings us back to the same point—that the makers must confer with the owners and that the owners must take counsel of each other before any decided action can profitably be taken. By all means let us have the Motor Wagon Users' Association. It is urgently needed at this present, and the need will increase as time goes on. The "Power Wagon" has already pointed the way and will continue to aid in the good cause. In our next issue we will have something more to say about it. In the meantime, let us have your ideas—makers, dealers, and users—and we will be glad to print anything that will be of use in straightening out an already too tangled situation.

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N. A. A. M. Considers Standards.

Recent Convention Held in New York City May Have Important Consequences.

THE MOST significant convention, as regards the power wagon section of the automobile industry, which has ever been held by the National Association of Automobile Manufacturers, took place at the association's headquarters in New York City on March 4 and 5 last, and was followed on March 6 by an executive committee meeting at which the convention recommendations were officially ratified or otherwise considered.

The principal objects of the meeting were to promote better acquaintance among the manufacturers, to discuss trade conditions and to recommend action by the National Association looking toward greater uniformity in construction, ratings, warranty and selling methods.

Pronounced interest in all questions taken up for discussion was evident and the results of this first general meeting of the trade are most gratifying to the committee.

* * *

List of Members Present.

There were present the following representatives: S. D. Waldon (Packard Motor Car Co.), presiding; W. E. Metzger (Metzger Motor Car Co. and Everitt Motor Car Co.); Charles Clifton (Pierce-Arrow Motor Car Co.); Benjamin Briscoe (United States Motor Co.); B. A. Gramm (Gramm Motor Truck Co.); F. I. Harding (Peerless Motor Car Co.); H. Kerr Thomas (Pierce-Arrow Motor Car Cor.); G. J. Loomis (Speedwell Motor Car Co.); Vincent Link (Universal Motor Truck Co.); M. T. Pilcher (Federal Motor Truck Co.); Albert L. Pope (Pope Mfg. Co.); W. C. Walker (Pope Mfg. Co.); C. E. Stone (Gramm Motor Truck Co.); P. K. Hexter (Gramm Motor Truck Co.); A. M. Chase (Chase Motor Truck Co.); E. O. Sutton (Knox Automobile Co.); A. W. Robinson (Locomobile Co. of America); A. J. Doty (The Lansden Co.); Will H. Brown (Mais Motor Truck Co.); Walter C. White (The White Co.); H. F. Flowers (American Locomotive Co.); Peter Dumont (Baker Motor Vehicle Co.); H. S. Diller (Lauth-Juergens Motor Car Co.); Morris Grabowsky (Alden Sampson Mfg. Co.); H. S. Stebbins (General Motors Truck Co.); C. H. Wallerich (General Industrial & Mfg. Co.); Herbert G. Streat (Knickerbocker Motor Truck Mfg. Co.); F. F. Lewis (Knickerbocker Motor Truck Mfg. Co.); J. T. Langhorne (Packard Motor Car Co.); E. W. Curtis, Jr. (General Vehicle Co.); Wm. P. Kennedy (American Locomotive Company and Baker Motor Vehicle Company); F. Nelson Carle (General Vehicle Company); Alfred Reeves (United States Motor Co.); S. V. Norton (B. F. Goodrich Co.); C. W. Fletcher (Walter Motor Truck Co.); G. A. Hodges (International Motor Co.); David S. Ludlum (The Autocar Co.); George H. Kelly (Baker Motor Vehicle Co.); H. E. Coffin (Hudson Motor Car Co.); and R. D. Chapin (Hudson Motor Car Co.).

Speed Ratings and Body Weights.

After a short address of welcome by Pres. W. E. Metzger, of the N. A. A. M., and a brief talk on trade conditions by Chas. Clifton, the meeting was called to order by Mr. Waldon. Following discussions on the different topics, the meeting made resolutions recommending adoption by the National Association of Automobile Manufacturers of uniform maximum speed ratings with load for motor trucks of different load capacities and uniform weight allowance for the simplest form of body regularly catalogued, as given in the accompanying table:

Load. Tons.	Rating. Pounds.	Miles Per Hour.	Weight Std. Body.	Weight Ld. & Std. Body.
½	1,000	16	500	1,500
1	2,000	15	600	2,600
1½	3,000	14	700	3,700
2	4,000	13	800	4,800
2½	5,000	12	900	5,900
3	6,000	11	1,000	7,000
3½	7,000	10½	1,100	8,100
4	8,000	10	1,200	9,200
4½	9,000	9½	1,300	10,300
5	10,000	9	1,400	11,400
6	12,000	8	1,600	13,600
7	14,000	7	1,800	15,800
8	16,000	6	2,000	18,000
9	18,000	5½	2,200	20,200
10	20,000	5	2,400	22,400

* * *

Overloading Not Encouraged.

The question of a standard allowance for occasional overload was given much attention and it was resolved that "in the opinion of the meeting it is inadvisable to encourage the belief that a truck is designed to carry any weight in excess of its rated capacity, or to permit a warranty to apply to any truck which is overloaded." The meeting recommended the preparation of a standard plate for the chassis on which should be stamped the rated capacity of the machine and some such admonition as "Do not overload."

* * *

The Demonstration Abuse.

There was considerable discussion regarding the abuse of demonstrations and the advisability of making charges by the day for demonstrations, the rate of charge to be based upon the capacity of the trucks. It was the consensus of opinion that such charges should be made, the payments therefor to be refunded upon purchase of the machine. No scale of charges was decided upon.

* * *

Standard Form of Warranty.

The desirability of a standard form of warranty was generally agreed upon, and after exhaustive discussion of the subject the following form was recommended to the executive committee of the N. A. A. M. for adoption:

"We warrant the new motor trucks manufactured by us for 90 days after the date of delivery to purchaser, this warranty being limited to the furnishing, in our factory, of such part or parts of the motor truck, as shall, under normal use and service, appear to us to be defective in material or workmanship.

"This warranty is limited to the shipment to the purchaser without charge, except for trans-

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portation, of the part or parts intended to replace the part or parts which, upon their return to us, at our factory, for inspection, we should have determined were defective, and provided the transportation charges for the part or parts so returned have been prepaid; and provided further that the said failure of said part or parts is shown not to be due to abnormal use, misuse, neglect or accident, accurring after such motor truck shall have been shipped to the purchaser.

"We make no warranty whatever in respect to tires, rims, ignition apparatus, lamps, gas tanks, signaling devices, generators, or other trade accessories, inasmuch as the same are usually warranted separately by their respective manufacturers.

"The condition of this warranty is such that, if the motor truck to which it applies, is altered or repaired outside our factory, or if it is operated at a speed in excess of its factory-rated speed, or if it is loaded beyond its factory-rated load capacity, then this warranty shall become null and void and our liability under it shall cease."

* * *

Tolerances for Felloe Bands.

With the object of securing greater uniformity of dimensions in motor truck wheels and bands, it was resolved to recommend that the dimensional tolerances of felloe bands recommended by a technical committee of the Society of Automobile Engineers, after a careful investigation, be adopted by the N. A. A. M. These tolerances are given in a report of the S. A. R. technical committee for February, 1912, as follows:

(a) Tolerance in circumference of felloe band shall be as follows:

	Plus.	Minus.
Before application to wheel	1/32 inch	1/32 inch
After application to wheel	1/16 inch	1/32 inch

Variation from precise measurement shall be uniform over entire width of band.

(This modifies recommendation in report accepted at the June, 1911, meeting of the society, to meet the requirements of the more extensive manufacture of rigid base tires.)

(b) Tolerance in width of felloe band:

	Plus.	Minus.
Up to and including 4 inches	1/32 inch	1/32 inch
4 1/16 to 6 inches	3/64 inch	3/64 inch
6 1/16 to 12 inches	1/16 inch	1/16 inch

(c) Variation in trueness of band when placed on surface plate: Band shall touch at all points within 1/32 inch up to and including 6-inch width. Over 6-inch width within 1/16 inch.

(d) Variation in thickness of band: 0.006 inch plus or minus.

(e) Trueness to round. The radial tolerance on the wheel when felloe band is applied shall be 1/16 inch plus or minus. This plus or minus tolerance must not occur at diametrically opposite points. There shall be no flat spots or kinks in felloe band on the finished wheel.

* * *

Committee to Seek Important Data.

Resolutions were also passed recommending that the commercial vehicle committee continue work in the direction of securing data on the width and length of chassis frames back of the seat with a view to possible future standardization of bodies for interchangeability on trucks of the same capacity; also toward securing data as to wheel diameters, height of frame or platform from the ground and corresponding heights of railroad cars and loading platforms.

In connection with discussion of the tire and maintenance questions following a very interesting paper on tires read by S. V. Norton, of B. F. Goodrich Co., and a talk on maintenance guarantees by W. P. Kennedy, the meeting recommended that the committee obtain and classify information regarding tire mileage in cities having widely different street conditions as concerns topography and character of paving.

Contracts and price reductions on quantity orders were touched upon as matters of interest to the trade, but no action was taken. Mr. Waldon made an interesting explanation of the Packard system of reductions on all orders for two to fifty trucks delivered within one year, and the information was developed that one or two other companies have adopted a similar contract plan.

The meeting adjourned to reconvene upon call on June 4, next, and on November 7.

* * *

Executive Committee Rulings, Show Dates, Etc.

At the N. A. A. M. executive committee meeting held on March 6 the following members were present: W. E. Metzger, Charles Clifton, S. T. Davis, Jr., S. D. Waldon, H. O. Smith, H. H. Rice, A. L. Pope, L. H. Kittredge, R. D. Chapin, Alfred Reeves, W. C. Leland, G. W. Bennett, and S. A. Miles (general manager). C. C. Hanch and Colonel George Pope were also present as guests of the committee.

* * *

Warranty Referred Back, Other Recommendations Passed.

The recommendations of the convention of commercial vehicle manufacturers, held on Monday and Tuesday were adopted, except as to the form of warranty, on which it was considered necessary to take some further legal advice, and which was, therefore, referred back to the proper committee for that purpose.

* * *

Dates for National Shows.

It was decided that the national shows of next season shall be held at New York, commencing January 11th, and at Chicago, February 1 to 15, the first week being devoted to pleasure and the second to commercial vehicles, as heretofore.

* * *

Money Grants.

The committee voted an appropriation of $1,500 in aid of the funds of the National Carriage Builders' Technical School; $5,000 to the general work of the American Automobile Association, and $5,000 to the Good Roads fund of the same organization.

* * *

N. A. A .M. May Combine with the A. B. T.

A plan, which has been for a long time under discussion, looking toward a combination of the work of the National Association of Automobile Manufacturers, Inc., and the Automobile Board of Trade, under the control of a single organization was discussed at length, and finally referred to a committee which will, in due course, confer with a similar committee to be appointed by the Automobile Board of Trade.

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Committees Appointed.

The president appointed, and the meeting approved, the following committeemen:

Commercial Vehicle Committee: S. D. Waldon (chairman), W. C. White, B. A. Gramm, Fred White.

Show Committee: H. O. Smith (chairman), A. L. Pope, W. C. Leland.

Legislative Committee: A. L. Pope (chairman), Benjamin Briscoe, Charles Clifton.

Committee on Contests and Demonstrations: Alfred Reeves (chairman), W. T. White, W. C. Leland.

Good Roads Committee: R. D. Chapin (chairman), S. D. Waldon.

Auditing Committee: Benjamin Briscoe (chairman), S. T. Davis, Jr., Charles Clifton.

Membership Committee: G. W. Bennett (chairman), L. H. Kittredge, S. T. Davis, Jr.

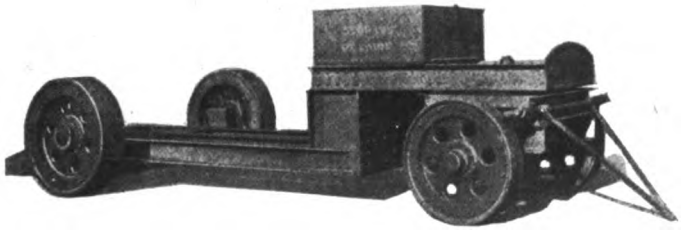
Traffic Committee: A. L. Pope (chairman), L. H. Kittredge, Hugh Chalmers.

Conference Committee: Alfred Reeves (chairman), A. L. Pope, R. D. Chapin.

Electric Vehicle Committee: H. H. Rice (chairman), W. C. Anderson, Fred White.

A 15-TON TRAILER.

The picture hardly conveys an adequate idea of the size of this mammoth trailer, which weighs 5 long tons (11,200 pounds) and is designed to carry a load of 15 long tons (33,600 pounds—nearly 17 short tons). It was built for an electrical firm in the north of England and will be pulled by a steam tractor. It is intended for the conveyance of heavy machine parts over paved streets.



A trailer that can carry 17 tons.

The wheels are fitted with springs on the Reid-Riekie system to reduce vibration. The rear wheels are 3 feet 6 inches in diameter by 11 inches wide, and each is fitted with 66 springs in two rows. The front wheels are 3 feet in diameter by 7½ inches wide, and each contains a single set of 26 springs.

The rear platform, made low for convenience in loading, is formed of three 8 by 4 inch steel I girders, connected behind by strong intermediate channel cross members, and to the down back axle, which is a solid machined steel forging with journals 6¾ inches diameter. At the forward end the platform girders are secured to a box-shaped transverse girder to the top of which is fixed a forebody, formed by 8 by 4 inch channel steel. The front axle is a rectangular 4 by 3 inch steel forging, secured through a cast steel pivot bracket and mild steel turning carriage rings to the forebody by a 2¾ inch steel center bolt. The rear platform is fitted with a fold-up skid plate, and powerful screw hand brakes are provided for each wheel. A large steel box is mounted on the forecarriage to hold loading tackle, etc. No springs are fitted between axles and body.

NEXT!

One of the largest makers of horse wagons in eastern Wisconsin has decided to go out of business as a result of motor truck competition. On January 1 last. the Hanson Wagon Works, established in 1852 at Manitowoc, Wis., was shut down permanently. The company has issued the following statement setting forth the reasons for its action: "The increasing use of and trade in motor vehicles and the consequent decrease in horse-drawn vehicles, as well as the great decline in the buggy and harness trade all over the country, are our main reasons for discontinuing this business." Who's next?

COWCATCHERS FOR LONDON MOTOR BUSES.

It was recently proposed in the "Daily News" of London, England, that some safety device should be affixed to the front of motor omnibuses. This idea has apparently been taken up and the board of the London General Omnibus Company is considering a new motor wheel life-guard, for which a patent has been applied by the inventor, Courtney Piggott.

In front of the two foremost wheels of the motor are placed two lengths of "leaf" spring, strong enough to push any obstacle out of the way of the wheels, or to prevent the vehicle mounting a curve, etc. At the head of the lifeguard are placed spiral springs which enable it to rise vertically if the wheels traverse holes in the roadway. The lifeguard is not only a "cowcatcher" but acts also as a buffer, protecting the vehicle from damage arising from collisions.

REDUCES DELIVERY COST 27.5 PER CENT.

A prominent department store in Portland, Ore., has been able to reduce the cost of delivery per package from 8 to 5.8 cents by substituting motor wagons for horse drawn vehicles.

The Good Intent Fire Company of Pottsville, Pa., has invested its motor fire wagon with one of the latest electrical self-starting devices. The apparatus was given a thorough test and proved satisfactory in every way.

The London (Eng.) General Omnibus Company, which receives $10,000,000 a year in fares from 200,000,000 passengers carried in about 1,500 motor buses, has been absorbed in an $82,500,000 merger comprising various railroad, omnibus, subway and street car interests in the British capital.

Boston power wagon factors are agitating to remove the restrictions which at present prevent the admission of motor wagons to the steamship wharves.

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The Modern Service Department.

What "Service" Actually Means in the Practice of a Really Big Manufacturer.

By E. W. GOUGH, E. E., M. A. I. E. E., Manager of Service Department, General Vehicle Company.

BUILDING MOTOR WAGONS is different from building pleasure cars—selling motor trucks is different from selling limousines, and maintaining real service for the customer is so different from the general conception of it that I hardly know how to begin. I was almost going to say that it was something which all but a few of the older manufacturers had hardly grasped yet, which might not be exaggerating at that.

Let me call your attention to something which has done more in my estimation to confuse the business man with relation to "Service" than anything else: A good 5-ton motor wagon—either gasoline or electric—costs approximately $5,000. Such machines are well built from high grade materials because their makers recognize that durability and a low rate of depreciation demand quality construction. But here comes the point which is hard for the outsider to understand—the highest grade power wagons, seemingly those which would require the least attention, are the ones which are backed by the best organized service departments. The manufacturers of these machines are spending all the way from $15,000 to $40,000 a year first to demonstrate, and then inspect and efficiently protect their trucks from breakdowns and abuses.

* * *

Adoption of Trucks No Small Matter.

Why has the business man heretofore responded so slowly to the claims of the power wagon? Because it was considered as yet in the experimental stage? In some cases, yes, but more because the whole-souled adoption of the motor wagon meant so much. It meant and still means: (1) A large initial expenditure (first cost); (2) disposing of a corresponding quota of horses and wagons; (3) a complete rearrangement of routes so as to speed up trucking or deliveries to the motor wagon pace; (4) in many cases the construction of a modern garage on ground formerly devoted to stables, the purchase of special machinery such as belt conveyors—in fact, improved shipping facilities all around. These things are necessary in order to keep the machines busy and so enable them to earn larger dividends on the investment.

Do you wonder that the business man with hundreds of thousands of dollars tied up in horses hesitates to adopt motor trucks? I don't, and I take off my hat to the pioneers—to the men who are today using fleets of from 50 to 100 machines and who, by reason of their grasp of the whole subject, are making them pay, and pay big.

* * *

Service Department Essential, For One Machine or One Hundred.

It may be that the term "service department" will be challenged as inadequate to convey fully all the ramifications of manufacturer-customer co-operation, but I will hold to it regardless of transportation engineers and others who are supposed to be able to make a more profound study of transportation needs than men in my capacity. Any good service department naturally has the closest kind of relations with the engineering and sales departments; and as for the factory, where would it secure first-hand data as to the performance of a new spring axle or tire but from the reports of the service department?

From the customer's standpoint the service department is essential whether he has one power wagon or a hundred. In very few cases are large fleets purchased at one time and it is often when the user is critically watching the performance of his first few machines that diplomacy, caution, patience and conscientious co-operation are most essential. There is much at stake for all concerned at this stage, and fortunate is the manager who has none but seasoned assistants at this time.

DEMONSTRATION

MACH. NO._____ CAP._____ ON_____ 1910

FOR_____

AT_____

BY_____

WEATHER_____ TEMP._____

ROAD_____

WORK DONE

TRIPS	LOAD LBS.	TIME OUT	TIME IN	MILES ODOMETER	DELAY LOAD	DELAY UN'LD	NO. STOPS	NO. PKGS. CASES, ETC.

TOTAL MILES FOR DAY_____ STOPS TOTAL TONS HANDLED_____

CURRENT USED IN CHARGE_____ K.W. HRS. WT. MACH._____

TOTAL NET RUNNING TIME_____ HRS._____ MIN._____

OVER FOR REMARKS ON SERVICE, GRADES, ETC.

Form 199. 5m. 4-27-'10.

Demonstration report card.

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WEEKLY REPORT Week Ending

Charging Battery No. In Vehicle No. 191

Time	Monday Volts	Monday Amps.	Tuesday Volts	Tuesday Amps.	Wednesday Volts	Wednesday Amps.	Thursday Volts	Thursday Amps.	Friday Volts	Friday Amps.	Saturday Volts	Saturday Amps.	Sunday Volts	Sunday Amps.
8 A.M.														
8.30														
10														
11														
12 Noon														
1 P.M.														
2														
3														
4														
5														
5.30														
6														
6.30														
7														
7.30														
8														
8.30														
9														
9.30														
10														
10.30														
11														
11.30														
12 Midnight														
12.30 A.M.														
1														
1.30														
2														
2.30														
3														
3.30														
4														
4.30														
5														
5.30														
6														
6.30														
7														
7.30														
Ampere hour meter														
Spec. Grav.														
Mileage														
Totals														

Weekly battery report card.

Let me give you a general idea of the work of my department.

* * *

What One Service Department Does.

The service department of the General Vehicle Company—

(1) Delivers and demonstrates the customer's vehicles.

(2) Trains their employes.

(3) Instructs them in the proper operation of their vehicles.

(4) Shows them how to install their charging apparatus.

(5) In many cases lays out the routes for their vehicles, and the work that the vehicles are to do.

(6) Keeps an eye on their operation after they are installed.

(7) Recommends changes or alterations in customer's apparatus which would work out to their best advantage.

(8) Makes an inspection of the customer's vehicles at irregular intervals, but approximately every 30 days.

(9) Recommends at any time auxiliary apparatus which may be desired by the vehicle owner.

(10) Is in readiness at any time day or night to render any service necessary for the successful operation of the customer's vehicles.

A Wide Range of Exacting Work.

The outside men in this department are all experienced inspectors and demonstrators who have a good general knowledge of electric vehicle needs under practically all conditions. They go out at all hours and are away from headquarters much of the time. In conjunction with our five branch offices the service department covers the whole United States and part of Canada. With G. V. electrics from Biddeford, Me., to Portland, Ore., and from Toronto, Ont., to Key West, Fla., their territory is a large one and it would be larger still if we attempted to include Rio de Janeiro and some other far off cities where we have vehicles in service. One man from this department did spend several months in Manila, instructing the Philipinos how to operate Uncle Sam's fleet of G. V.'s, but such trips are not the general rule. If they were, we should need a much larger force in this department.

I know of no line of work where more is expected of the versatile inspector. He must be sober and diplomatic at all times. He must be patient, courteous and quick to respond to a call for his services regardless of the hour. He must keep his temper even under abuse and criticism, which is many times uncalled for and unjust. He must expect at times to see his advice ignored, even when to ignore it (with respect to overloading, for example) means needless expense to the customer. You can readily see that not every man, however expert his mechanical knowledge, is fitted for service department work.

The service department may be likened in some re-

Report of Station Sup't, for Yesterday 191

Weather Roads

Trucks in Service

Trucks out of Service

Remarks

Accidents (detailed report also)

Truck Record

Wagon No.	Driver	Time Out	No. of Trips	Days Deliveries	Days Mileage	Average Load	Time In	Driver Reported Wagon	Inspected

spects to a doctor or a policeman. No one has much use for either until he gets in trouble.

And the personal equation counts for so much. How many machines get a black eye in the matter of mileage when a closer investigation would reveal that the driver had blamed the motor wagon for the time he spent behind the swinging doors.

Again, while it cannot always be helped, "service" will overstep itself. A telephone call comes in that a machine is stuck at, say, Smith's corner—five miles away. A service man jumps on a trolley and when he gets there the motor wagon is gone. The driver had called for help first, then he had looked over his machine, found some trifling thing wrong like a loose wire caught, fixed it in two minutes, and had gone on his way rejoicing, blissfully unconcerned as to the wrinkled brow of the service man.

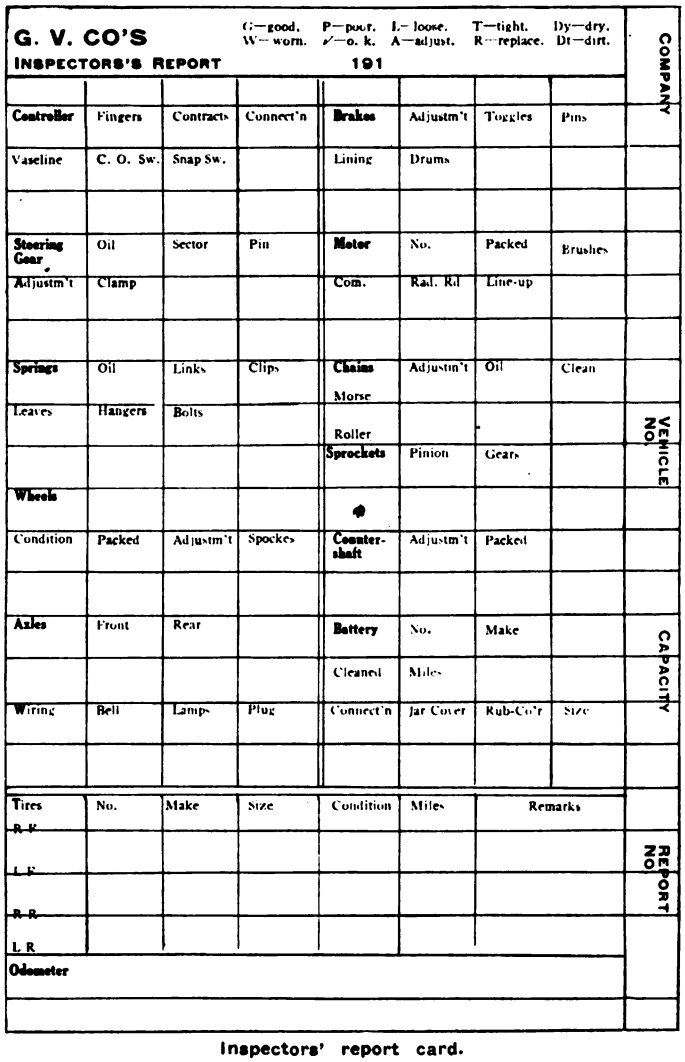
* * *

Accurate Records Now Kept of All Machines and Performances.

Take the service department records of something over 2,000 G. V. trucks scattered from Maine to California and you have almost a guide book of the motor wagon industry—I mean as regards new models, capacities and the march toward standardization. Beginning with February, 1901, you can go down the line to February, 1912, and follow the fortunes (and misfortunes) of scores of the old veteran machines whose relatively crude construction as compared with 1912 models is almost laughable and whose daily mileages, where available, still more so. In isolated cases a truck has been known to develop—well, "aliases" you might call them, for they keep bobbing up here and there bearing a different firm name. In most cases, however, the veterans are still in the hands of the original owners, plodding along each day with the newer, simplified models —a tribute to their sturdy construction and the faith of the pioneers in the industry.

In the early days, of course, performance records were hard to get, but now I believe the leading manufacturers have these in pretty good shape. Certainly the department I represent does much painstaking work in this respect. Beginning with the factory road tests which are carefully kept, records of demonstration tests are recorded and very frequently records of one machine on several routes, for adaptability is important both in capacity and mileage. Monthly inspection reports for practically all machines are filed for reference and these are a great help in determining the need of parts, renewals, etc. It is almost needless to add that practically all accidents, when notified, are investigated and reported, and that by consulting the service department the history of practically every truck can be ascertained, from the number of hard luck incidents and parts renewals, if any, down to a diagnosis of its present symptoms or perfect health and record as the case may be. The majority of our power wagons are in good health, I am glad to say, otherwise my large family would certainly worry me.

Before closing, let me say that I do not wish to create the impression that any of us has solved all the problems pertaining to motor wagon maintenance and supervision, for this is not so. The industry is young yet and we are all human. Many unavoidable delays, misunderstandings and sometimes hard feelings will develop, but they melt away, usually, in a common desire to be fair and keep the machines a-moving.



G. V. CO'S INSPECTORS'S REPORT 191

G—good. W—worn. P—poor. ✓—o. k. L—loose. A—adjust. T—tight. R—replace. Dy—dry. Dt—dirt.

COMPANY

Controller	Fingers	Contacts	Connect'n	Brakes	Adjustm't	Toggles	Pins
Vaseline	C. O. Sw.	Snap Sw.		Lining	Drums		
Steering Gear	Oil	Sector	Pin	Motor	No.	Packed	Brushes
Adjustm't	Clamp			Com.	Rad. Rd	Line-up	
Springs	Oil	Links	Clips	Chains	Adjustm't	Oil	Clean
Leaves	Hangers	Bolts		Morse			
				Roller			
				Sprockets	Pinion	Gears	
Wheels							
Condition	Packed	Adjustm't	Spokes	Counter-shaft	Adjustm't	Packed	
Axles	Front	Rear		Battery	No.	Make	
				Cleaned	Miles		
Wiring	Bell	Lamps	Plug	Connect'n	Jar Cover	Rub-Co'r	Size

VEHICLE NO.

CAPACITY

Tires	No.	Make	Size	Condition	Miles	Remarks
R F						
L F						
R R						
L R						
Odometer						

REPORT NO.

Inspectors' report card.

* * *

The Service Department of the Future.

A man asked me the other day what I was going to do when we had 10,000 trucks in operation. "You'll need some force to handle that many if you go at it as thoroughly as you do now," he continued. All I can say is that we are all learning. Perhaps in five years more big buyers of trucks will put their purchase and care on a real business basis just as they do other investments, and that will help. By that time we shall certainly have thousands of capable garage men and drivers and the need of inspectors may be less. Or some bright man may build in each city a wonderful garage where those who have no room to store their own trucks can have the entire responsibility of care and maintenance taken off their hands by that unique organization. They say the crisis produces a man to meet it, so let us hope that necessity will produce the goods in this case. If we all do our part now it ought to help some.

Peoria, Ill., has a motor ambulance.

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Motor Mail Wagons.

Recent Types in the French Capital, Which Has Long Used Mail Motors.

SEEING THAT the city of Paris has no less than 130 main or branch post offices within its area, the question of carrying the mail between postoffices and railroad stations needs to be well looked after. Several years ago the horse vehicles were replaced by small storage battery vehicles, and then these were abandoned for gasoline motor cars of the prevailing type. However, within a recent period, it was decided to adopt a new wagon which would be in line with automobile progress, so that the postoffice department called upon two of the leading Paris constructors to furnish the new mail wagons. It is only within a short time that these have made their appearance on the streets, and they are favored for their attractive shape and silent running. Besides, they are much better than the old vehicles from a mechanical standpoint.

Part of the postal wagons come from the well known De Dion-Bouton works. These have a 4 cylinder motor of 3.6 inch diameter and 4.8 inch stroke, rated at 18 horsepower. The motors are of the most recent design and have cam-driven valves, high-tension magneto ignition, and automatic carburetor. The speed changing box has double sliding gear, and direct drive at high speed. Speeds of 5.5, 10 and 18 miles an hour are used, and the present wagon is designed to carry a net load of 2 tons. Rod drive to the differential on the rear axle of the standard De Dion-Bouton type is used here. The steering wheel is placed on the left hand side, and the car is fitted with the usual brakes, those on the rear wheels being worked by a lever and the brakes on the speed changing box with pedal movement.

The rest of the wagons are built by the Delahaye firm, and the wagon body adheres to the same general design, although the chassis is of different design, especially as to the drive, as a chain drive is here used on the back axle. The Delahaye wagons are built in two different types, and the first of these has a 12 to 16 horsepower, 4-cylinder motor of 3 inch bore and 4.4 inch stroke, with 3 speeds and reverse. It takes 70 cubic feet or 0.9 ton net load. The second type uses a heavier motor of 16 to 20 horsepower with 3.4 inch bore and 5.2 inch stroke, and holds 100 cubic feet or 1.3 tons net load. Solid rubber tires are used on all the postal cars.

The Delahaye postal wagon.

De Dion-Bouton postal wagons.

MOTOR MAIL SERVICE IN SANDUSKY.

With permission of the Postoffice Department, George J. Hartman, in charge of the collection of mails in the outskirts of Sandusky, Ohio, has applied the $275 a year allowed for horse feed and repairs to mail wagons upon the purchase price of an automobile in which he has already begun covering his route.

The Postoffice Department has asked Postmaster Charles G. Schippel for reports on the experiment.

LOW TAXICAB RATES IN MONTREAL.

The Canada Auto and Taxi Company, of Montreal, has decided to reduce its fares by one-half during business hours. The new tariff is as follows:

Tariff 1—Applicable to one or two persons, from 6 a. m. to 7 p. m., 20 cents per mile.

Tariff 2—Applicable to one or two persons, from 7 p. m. to 12 m., or three or four persons from 6 a. m. to 7 p. m., 40 cents per mile.

Tariff 3—Applicable to three or four persons, from 7 p. m. to 12 m., 50 cents per mile.

Night Work.

From 12 m. to 6 a. m., one, two, three or four persons will be charged tariff 3 with 20 cents extra per trip or per one-half hour drive.

Waiting Time.

Day or night work, $1.50 per hour.

Trunks or any luggage or parcel carried on front seat, 20 cents apiece.

Outside city limits—If car called empty to go outside city limits, tariff 1 will be applied to go, return trip being charged according to above indications.

Returning empty from outside city limits—Charged half fare to go.

The authorities of Somerville, Mass., have purchased a motor patrol and ambulance for the police department.

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Motor Wagon for Road Repair.

A Valuable Article for All Who Are Really Interested in Good Roads.

By LOGAN WALLER PAGE,
Director of the United States Office of Public Roads.

DURING the road building season last year about $142,000,000 was expended in this country on road construction. A considerable portion of this money was raised by bond issues. In most of the communities where bonds were issued, practically no serious thought has been given to maintenance of the roads after they are constructed. In other words, 30 or 40 year bonds were issued for 5 year roads. It is impossible for this condition to obtain for any considerable length of time, for we can not continue to borrow money for the construction of roads and let them go to ruin. It is necessary for us to turn our attention more to the maintenance problems than to those of construction, for the former are far more complicated under the present condition of traffic. As far as I have been able to ascertain, practically no data on maintenance exist in this country. A few of the state highway commissions are inaugurating plans for maintenance, and also a very few counties, but aside from this, almost nothing has been done.

The cost of maintenance for the national roads of France has been more or less our guide for many years, but my observations lead me to believe that the French roads today are not being maintained as they should be. This I believe is due to two causes: one, that a sufficient amount of money per mile per year is not being expended, and the other, that I do not consider, under present traffic conditions, that the canton system of road maintenance is effective.

The British system of maintenance can hardly be called a system, but, judging from the results obtained, I think it is more thorough, and gives better results than the French. It must be remembered, however, that the British maintenance costs almost twice as much as the French.

* * *

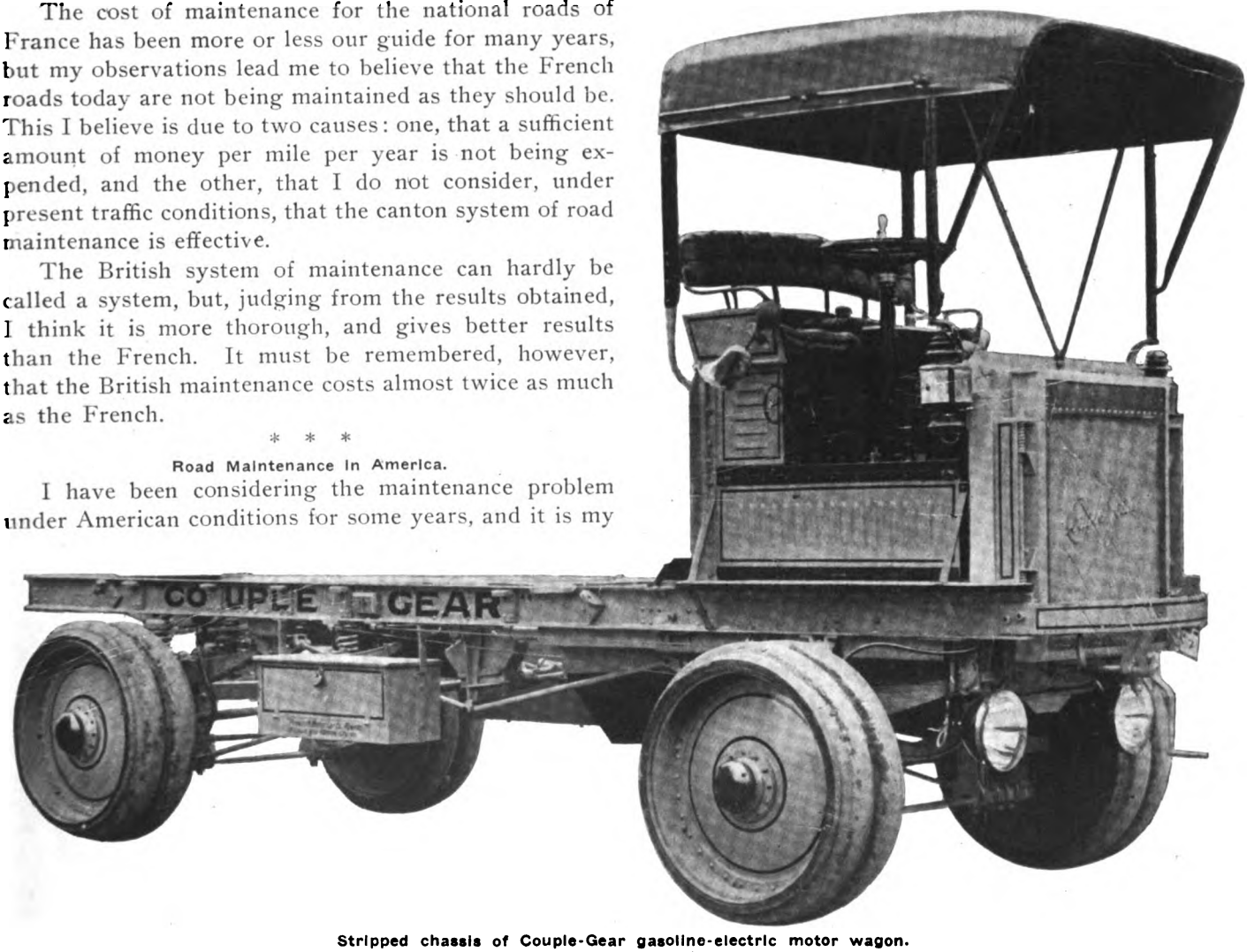
Road Maintenance In America.

I have been considering the maintenance problem under American conditions for some years, and it is my belief that the canton or patrol system will not meet the conditions that obtain on a bituminous macadam road. When such a road is properly constructed, for at least a year and a half there is almost nothing for the patrolman to do but walk over it. When trouble comes, it is generally due to the disintegration of the binder, bringing about loose spots on the surface. For a patrolman to repair such trouble is expensive, for a tar kettle, stone, and small tools are necessary. Such work can be done better and more quickly with a small gang of men, and if a quickly moving vehicle to carry the equipment and men is obtainable, a considerable length of road can be repaired in a very short time. On roads that have a bituminous blanket coat treatment, this method of maintenance is even more applicable than on roads built by the penetration or mixing method.

* * *

Motor Wagon for Road Maintenance.

With this idea of maintenance in mind, some months ago the Office of Public Roads engaged the services of



Stripped chassis of Couple-Gear gasoline-electric motor wagon.

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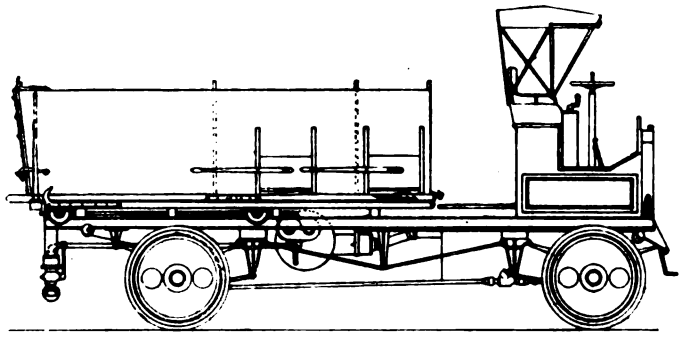


Body with removable partitions for carrying different materials.

one of the ablest motor wagon designers* in the United States for the purpose of designing a motor maintenance car or train, the thought being that we might "cure the bite with the hair of the dog." The instructions given to this designer were that the train or motor wagon should have the capacity for maintaining at least 100 miles of bituminous macadam road, and should have the necessary equipment to apply blanket coat treatments. The result of this investigation was as follows:

The object to be accomplished is the development of an automobile equipment which will include all the apparatus and facilities necessary to efficiently employ a repair gang of eight men in the maintenance of road surface over 100 miles of roadway, or more, as the working conditions will permit.

This equipment is to be capable of making quick transport of men and their necessary working outfit between a central base or headquarters and the various places along the roadway where repairs may be necessary; the equipment to carry, as well as men and apparatus, enough road repair material for a number of quick repairs in isolated places, when these are not very extensive. Where extensive repairs are necessary and require considerable material, the equipment is to be flexible enough to provide for rapid conveyance of stone or other material from a distant supply station to the place of operation.

The purpose of developing such an equipment is to provide an actual working outfit as a practical exemplary inducement to state highway commissions and others charged with road maintenance to procure and use similar outfits, thereby effecting a much greater efficiency and economy than can be accomplished with existing methods and insuring the collateral advantage of a better condition of road surface, in view of the facility with which timely repairs can be made.

* * *

Desiderata for Motor Road Repair Apparatus.

This purpose as set forth has three significant implications: First, that the cost of the equipment shall be kept consistently low or within the range of customary expenditures in this direction; second, novel or especially manufactured apparatus shall be avoided so that equivalent apparatus can be secured in any locality, and further, that existing investment in similar details of equipment can be made use of; third, that the outfit shall be so flexible in its make-up as to readily serve a variety of utility or lend itself to peculiar requirements under varying conditions.

These considerations necessarily prohibit the employment of any cumbersome or expensive tractor trains and demand, rather, a single machine with ability to handle a single trailer where such may be required. This machine should be capable of performing all the useful transporting functions required in road repairs, as well as being serviceable for maintenance work, such as the distribution or sprinkling of road oils or bituminous material, and furthermore, should be available during the winter season for general trucking purposes, such as snow and refuse removal or other hauling service.

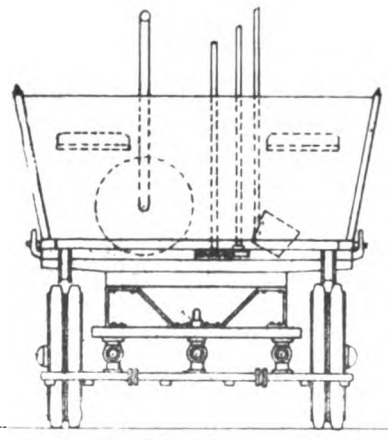
In performing service in road repairing, the machine should incorporate as many of the requirements of a portable power plant as possible, such as hoisting, pumping, and where necessary, air compression and power shaft driving. It should have considerable traction ability, and be capable of operation at a reasonable speed when loaded, as well as a higher speed for empty return trip or emergencies.

* * *

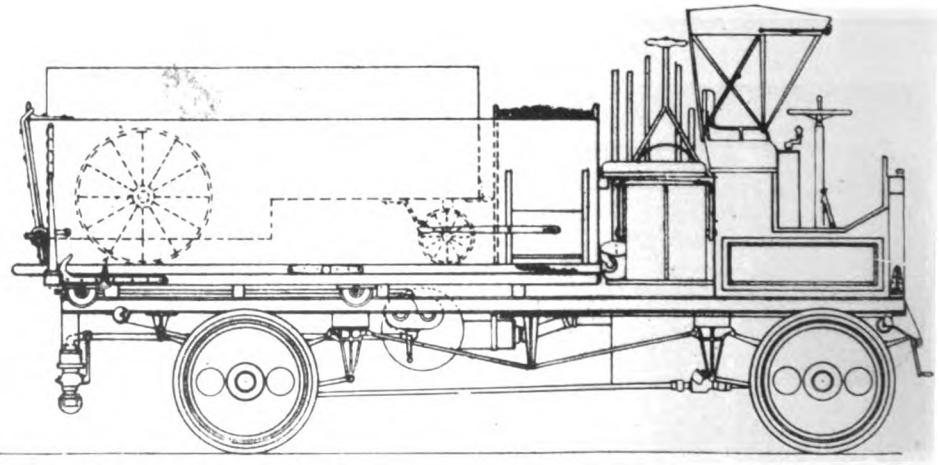
Gas-Electric Machine Fills All Requirements.

To secure the required combination in such an outfit the entire supply of available equipment on the market has been investigated and carefully considered.

*William P. Kennedy, consulting engineer with the American Locomotive Company and the Baker Motor Vehicle Company.



End view, showing tools and seats.



Outfit loaded ready for service.

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The automobile chassis selected for recommendation is the 5-ton, gas-electric manufactured by the Couple-Gear Freight Wheel Co., Grand Rapids, Mich. This is well developed and has been in a variety of rigorous service for a number of years. Its availability and service capacity are vouched for by a number of merchant users and its flexibility is well shown in the United States War Department, Engineer Department at Large, Professional Memoirs, Volume 3, No. 9.

The advantage in this line of work of a traction drive at each of the four wheels will be appreciated and the range of application of the power of the machine to auxiliary work performing apparatus by its conversion into electric current is self evident.

* * *

Machine Carries Electric Hoist and Auxiliary Equipment.

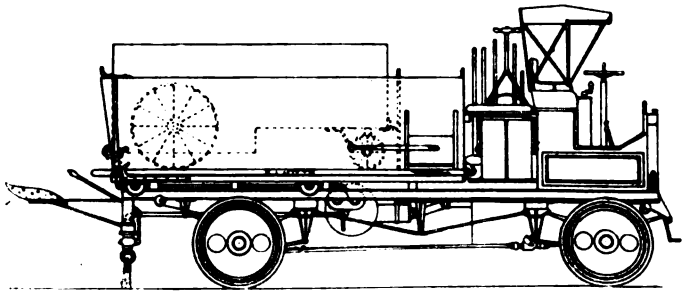
This chassis, in addition to its regular equipment, is fitted with a Sprague electric hoist, the purpose of which is to aid in loading and unloading the body and other apparatus which the machine carries (to be described later), as well as for general hoisting external to the machine whenever required. The electric motor of this hoist is directly connected to a rotary pump which is used to force the road oil or bituminous material from a tank, carried on the machine, through a distributing device permanently attached to the rear of the chassis. This electric hoist and rotary pump are located forward, and at about one-fourth the distance from the rear to the forward wheels, below the floor of the body which rests on the chassis. The pump and distributor recommended for permanent attachment to the chassis by the automobile engineer are a part of the H-P spreader built by the A. Burlingame Co., of Worcester, Mass.

* * *

Chassis May Be Fitted with Removable Platform or Dump Body.

This chassis can be fitted with a removable platform body of any convenient or desirable dimensions with or without stakes or side racks when the machine is used for hauling purposes in those seasons of the year when road work is not feasible.

The chassis may also be fitted with a steel dumping body, having a length of 130 inches, a height of 36 inches, a bottom width of 56 inches, and top width of 78 inches. The forward half of this body should have



Machine for use in distributing bitumen.

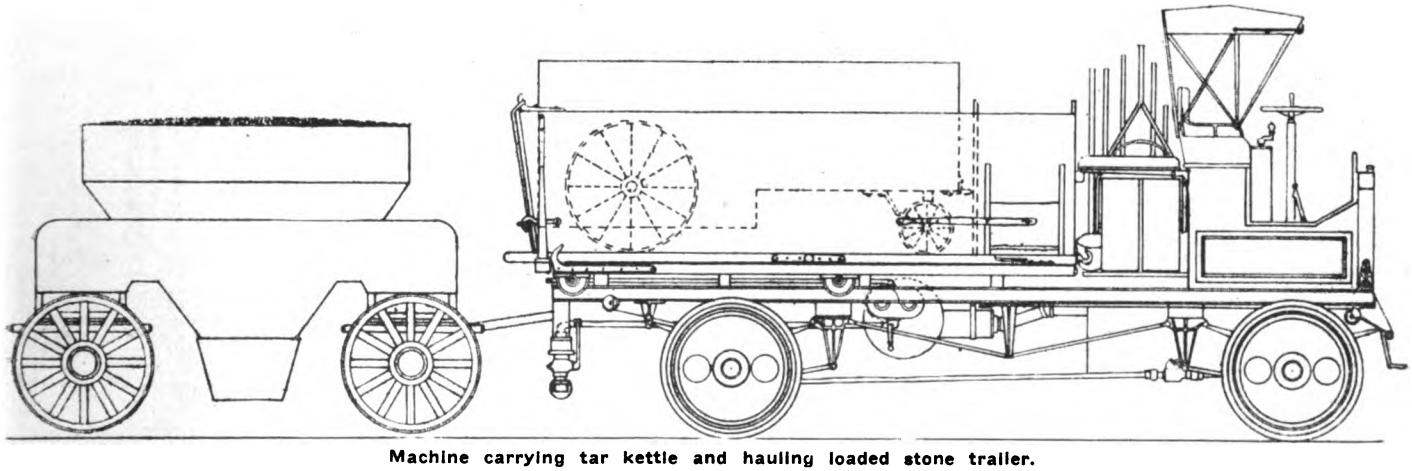
two removable partitions, so placed that one cubic yard of material can be carried in the forward space and two cubic yards of material in the rear space. Each of these two spaces should have vertical sliding side doors, operated by hand levers, to allow material to be unloaded from the floor of the body rather than over the sides. The purpose of these removable partitions is to provide for carrying a variety of road material, or to carry a limited amount and to permit the balance of the body being used for other purposes. This body should be so located on the chassis as to leave sufficient space behind the driver's seat and in front of the dumping body for carrying tools and men. The body should be entirely removable when the machine is required for a platform wagon. In operation for road work, this steel body can be dumped either by hand winches or by a proper arrangement of pulleys, utilizing the electric hoist for this purpose. This dumping body would be mounted on or removed from the chassis by the use of the electric hoist.

* * *

Tar Heating Kettle Forms Part of Equipment.

The next essential part of the equipment is a tar heating kettle of sufficient capacity to be serviceable on the roadside for repair work or to serve the purpose of a distributing tank wagon when carried on the machine.

For this purpose a 500-gallon kettle, mounted on wheels and of such dimensions that it will occupy all of the dumping body but the forward one-yard compartment referred to, is recommended. About the only change necessary to adapt any of the standard tar heating kettles to this purpose would be the shortening of the rear axle. The tar kettle may be loaded and unloaded by means of the power winch.



Machine carrying tar kettle and hauling loaded stone trailer.

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On either side of the tool carrying compartment immediately in front of the dumping body there should be seats provided on each side for two men. The driver's seat will also be wide enough to carry four men, so that eight men in all may be transported. It is also presumed that the foreman of the gang will operate the machine.

* * *

Practical Operating Methods.

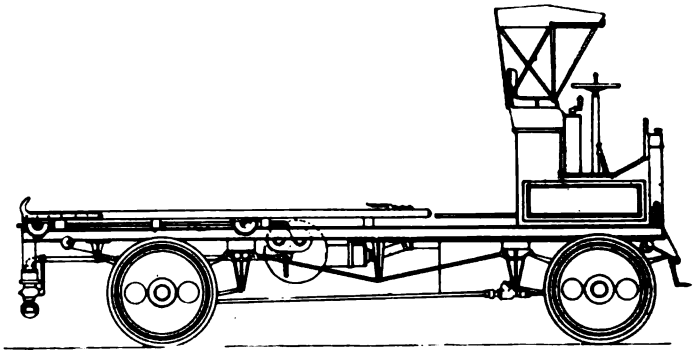
With the equipment described, it will be quite possible to do isolated patch work over a long stretch in caravan fashion without dismounting any of the apparatus. In such service, the small stone compartment may be replenished at stone supply stations along the route, and if these do not exist and it becomes desirable to carry on the machine a larger working supply from the original base, the tar kettle could be projected outward some distance at the rear of the body so as to use the forward half of this body for stone, but it would be preferable under such working conditions to use a tar kettle of smaller capacity.

It may be suggested here that a feasible means toward operating in transit as described would be to provide at various points in the system of roads to be cared for a number of supply stations where stone and bituminous materials could be kept on hand. These stations could be periodically replenished by the machine under consideration.

When working under normal roadside conditions, where a large amount of work is to be done, the machine would proceed, loaded, from headquarters to the place of operation, where the tools and preliminary stone supply would be removed and the tar kettle unloaded. This would leave the machine free to be used immediately for the transfer of stone in quantity from the nearest base of supply.

Should it be desired to transport material of a character for which the dumping body would be a handicap, such as long timbers for bridge work, the steel body could be temporarily removed and the machine used as a flat platform wagon.

In the event of work being so far from the stone supply base as to keep the gang inactive during the return trips of the machine, a trailer could be used to furnish a larger initial supply and transport a greater quantity for each of the subsequent trips. It might also be used to make the outfit and initial supply complete for extremely isolated or outpost work.



Machine for use as platform wagon.

* * *

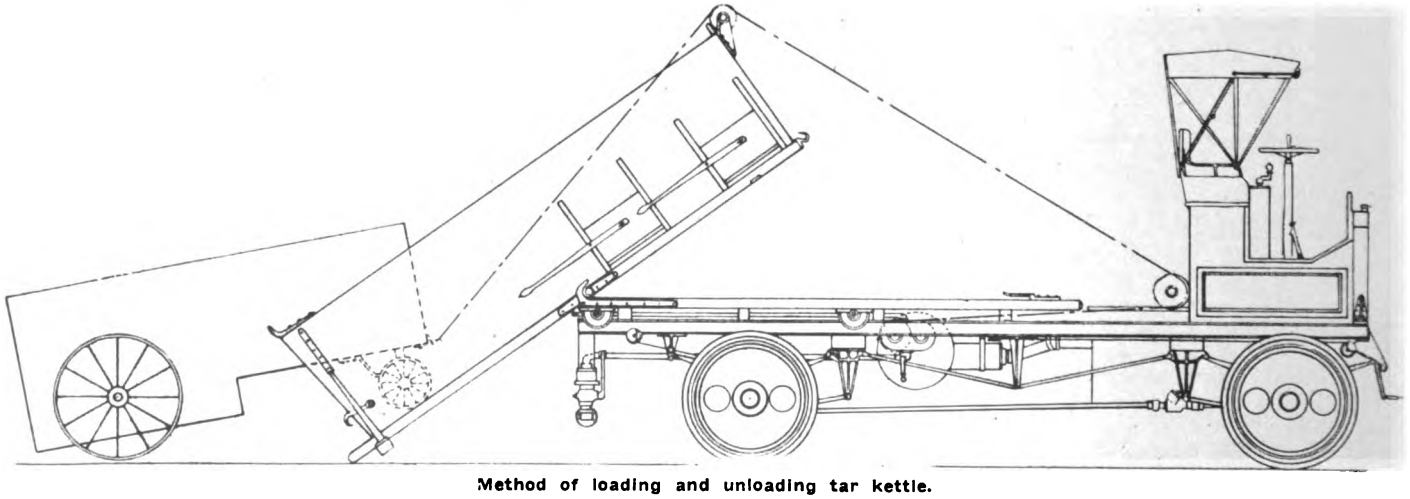
Using the Machine as a Sprinkler or Spreader.

To use the machine as a sprinkler of road oils or a spreader of bituminous material, the tar kettle is loaded in the steel body, and, by means of a pipe connection at the back of the machine, the rotary pump is supplied with the liquid material from the kettle, which it forces through the spreader, and for such a use a removable rear seat is provided. In long trips away from the supply of oil or bituminous material, an additional supply in barrels may be carried in the forward part of the machine.

To get the required heat for bitumens, the firebox of the tar kettle can be fitted with a removable gasoline or kerosene burner. If gasoline is used as a fuel, the regular tank on the car can be made to furnish the supply. If kerosene is used, an auxiliary tank can be located on the chassis frame, and the necessary pressure in either case furnished by the exhaust from the engine. The feature of having this burner removable admits of the use of wood in the firebox for roadside work.

Should the employment of the tar kettle as above described be considered inadequate in the matter of capacity, a complete tank equipment could be provided and placed on the chassis when required for this service.

In the event of compressed air being desirable for any part of the work, the machine can be fitted with an electric air compressing outfit.



Method of loading and unloading tar kettle.

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In selecting a pressure type of distributor, consideration is given to the speed at which the machine may be made to work. If this is not required, there are several cheaper forms of gravity devices on the market which may be applied.

* * *

Estimated Cost of Machine and Equipment.

An approximate estimate of the total equipment suggested above is as follows:

Machine with steel dumping body	$6,000
Sprague electric hoist	250
H-P spreader, with rotary pump and piping	700
Tar kettle, 500-gallon capacity	300
Double kerosene burner outfit	200
Tools and accessories	50
Total	$7,500

POWER WAGONS DISPLACE MULES.

One of the most interesting power wagon developments of the last year is the decision of the Great Western Power Company to replace immediately its mule teams in Plumas county, Calif., by motor trucks. A contract has been closed by the Speedwell Motor Car Company of California for furnishing the Great Western Company with six Speedwell trucks of 6 ton capacity for hauling their tonnage from Keddie to Big Meadows, a distance of 26 miles. Previously this work was done by six and eight mule teams, averaging the round trip in three days, this slow progress being due to the narrow mountain roads, with their treacherous curves and steep grades.

The deal was concluded by L. V. Lynch, manager of the Speedwell Motor Car Company of California, and R. Harry Croninger, manager of the truck department of the Speedwell factory. Lynch and Croninger, both experienced in analyzing problems of this character, went over the roads in a stage, making careful notations of the conditions, to determine if motor trucks were practical. Their deductions were that power wagons could be used and effect enormous savings for the Great Western Power Company. Upon this the contract was placed.

The Great Western Power Company will move approximately 10,000 tons in 200 days. This is composed principally of cement for its new storage dam at Big Meadows. This reservoir, when completed, will be the largest artificial body of water in the United States. In addition the commissary supplies for an army of men must be handled and more than a million feet of lumber must be hauled out. Operations will begin on this contract April 1 and by May 1 the Speedwell company expects to have the trucks dispatched with punctuality and move in approximately 40 tons per day. This means about 260,000 ton miles in, and an inestimable amount of ton miles out. Mr. Croninger is working on many problems of a similar character; in fact he has been requested to analyze a most difficult problem of a 45 mile haul in Montana.

The handling of these enormous tonnages in the mountains by power wagons is an entirely new and different application from the ordinary commercial work, and the situation must be studied from every angle in order that the purpose may not be defeated. The drivers and operators for mountain work must be educated on account of the many hazards. Braking efficiencies must be explained to the operators, and the entire train of Speedwell trucks will be dispatched and run on schedule, the same as a railroad. Drivers will be taught to approach curves at a certain speed, so that they can be negotiated without hazard, for in many places there is an outside clearance of but eight inches.

Another consideration is the passing of teams and other traffic. "Turn-out" spaces are few and far between, but since it is expected to dispatch the trucks in fleets and trains, Mr. Croninger feels sure that the trips can be made with the same punctuality as trains, and by this means accustom the natives to the time of passing certain places. Each machine will be equipped with electric signals which can be heard for three miles by actual test.

NEW GERMAN ARMY MOTOR REGULATIONS.

After a trial of an army motor truck, with trailer, for the German army certain modifications have been proposed by the trial commission and will probably be adopted by the Ministry of War. The accelerator is to be dispensed with; a self-starter is to be secured to the dash and must be actuated by electromagnetic or equivalent means. The gear speeds must be three to four kilometers per hour for the reverse and the slow speed five to eight for the second, nine to thirteen for the third and not higher than sixteen kilometers on the high. The brake for the trailer must be operated from the driver's seat, the action being transmitted from a rotary shaft through a system of tension rods extending under the middle line of the truck to the trailer, but not by compression rods or wires. The coupling on the trailer for attaching another trailer is to be abolished. A cut-out is again to be provided for the exhaust muffler—it had been abolished before—as it has been found that the gain in power which may be secured by its use may be valuable in time of war, but it is to be screwed down tight in time of peace, so as to obviate breach of the police regulation.

$50,000 FOR FIRE MOTORS IN COLUMBUS.

Columbus has authorized a bond issue to raise $50,000 for the purchase of at least 10 pieces of motor fire apparatus. Some tractors will probably be installed to pull existing apparatus, now horse drawn.

"The fact that we are steadily increasing our equipment of motor vehicles in our urban service demonstrates our belief in such class, as compared with horse drawn wagons," says Elisha Flagg, manager of the Department of Equipment and Supplies of the American Express Company in New York City.

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Burlington's fire motor in front of headquarters after a run in 15 inches of snow at 25 miles an hour.

Fire Motors in Winter.

Enthusiastic Reports from Fire Chiefs on Good Work of Machines.

THERE ARE some who assert, without knowing the truth of the matter, that while motor fire apparatus may be all that is claimed for it in ideal weather, it is unreliable in winter and is liable to become stalled in heavy snows or to skid badly on ice covered streets; in other words, that the "old, reliable" horse is the only dependable form of traction under abnormal weather conditions. As a matter of fact, the cases are actually reversed—the motor is reliable in winter as well as at other periods of the year, while the horse is severely handicapped and not to be depended upon when the weather conditions are unfavorable.

In order to establish the truth of this contention, the "Power Wagon" herewith publishes a number of official reports from the fire chiefs of some of the cities and towns which have adopted motor fire apparatus. In not a single case was there received a report that was unfavorable to the fire motor.

* * *

Burlington, Vt., March 14, 1912.

"We have had our combination motor fire apparatus in service for the past 13 months, giving us two winter tests, and we are more than pleased with it. It is much cheaper and a great deal quicker than horse drawn apparatus. Burlington, the Queen City of Vermont, is situated on the shores of Lake Champlain. The streets running easterly are very hilly and steep. We have very cold weather and lots of snow, and this winter we have had extremely cold weather and an enormous amount of snow. The motor has responded to 170 alarms since it was put in service, and has always reached the fire and has never refused to start or go. It has often plowed its way through from 15 to 18 inches of snow this winter at the rate of 20 miles an hour, when our horse drawn apparatus had to walk. We are more than pleased with the machine and I have already recommended to the City Council the purchase of more such machines and doing away with the horse drawn apparatus. The motor has cost us 27 cents a day for the past 13 months, while the upkeep of two horses is $1.33 a day."

C. A. NILES, Fire Chief.

* * *

Lansing, Mich., March 12, 1912.

"Our city came through the winter in fine shape with our motor fire apparatus. We were out in all kinds of weather, in blizzards and with the temperature anything from zero to 26 below most of the winter. We have in service in our city two motor pumping engines, one motor chemical engine, two combination motor hose and chemicals, and one fire chief's motor car. At the Hotel Downey fire one of our motor pumping engines pumped water continuously for 13 hours at a pressure of 30 pounds, and the other for 10 hours at a pressure of 45 pounds, with the temperature at 12 degrees above zero. We have but one pair of horses in our department, for drawing a truck, but we intend soon to replace this outfit with a motor aerial truck."

HUGO R. DELFS, Fire Chief.

* * *

Superior, Wis., March 12, 1912.

"We have had no trouble in responding to fires with our chemical and hose auto this winter. It went through the snow with ease, and on icy streets it cannot be beaten. Cold weather does not bother it."

OLAF JOHNSON, Fire Chief.

* * *

Portsmouth, Ohio, March 11, 1912.

"Our motor fire apparatus has responded to 30 calls within the last 10 weeks and has done it without any

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skidding or sliding. It is much cheaper and faster than horse drawn vehicles."

CHAS. E. HANCOCK, Fire Chief.

* * *

Paterson, N. J., March 11, 1912.

"While we have had very few snowstorms during the past winter, the streets have been covered with ice for many weeks. Our motor propelled apparatus has done splendid service, and at no time was its efficiency impaired because of the ice or other weather conditions. We have, however, found it difficult to keep horses sharpened, and in this respect there is no questioning the superiority of the motor apparatus over the old style horse drawn machine."

JOHN STAGG, Fire Chief.

* * *

Chicago, Ill., March 13, 1912.

"During the recent wintry weather we have had a number of opportunities of judging the comparative merits of motor driven fire apparatus over the horse drawn vehicles, when operating on icy streets, in blizzards, or when the temperature was at an extremely low mark, and it is a comfort to feel that in the near future we may be able to save our dumb animals the distress of being compelled to endure the icy blasts during such bitter weather, and the rate of speed an apparatus can develop in reaching fires goes far towards lessening the danger to the men in fighting flames. Quick time is a great factor in our line of work, and the sooner a small blaze is attacked the less chance we have for a disastrous blaze. We have a numer of combination motor chemical engines and hose wagons in service now, and I am well satisfied with the results obtained both in the downtown and outlying districts, and trust that much more motor driven apparatus will be installed throughout the department at an early day."

CHAS. F. SEYFERLICH, Fire Chief.

* * *

Wilkes-Barre, Pa., March 12, 1912.

"Our motor fire apparatus is giving us no trouble this winter. It is always ready in any kind of weather. All that is necessary is to keep chains on the wheels, and we never have had any trouble with skidding of any kind."

JOSEPH G. SCHULER, Fire Chief.

* * *

Alliance, Ohio, March 12, 1912.

"Our motor apparatus has proved successful in all emergencies this winter, and we have not had one bit of trouble on icy or slippery streets, and have made better time than horses, as we have had our horses slip and fall several times, while we have not had one failure to get the motor apparatus to a fire. We have had the best of success with the motor fire apparatus since installing the same 30 months ago."

ARTHUR S. AUNGST, Fire Chief.

* * *

Worcester, Mass., March 11, 1912.

"In regard to motor fire apparatus I consider it incomparably superior to horse drawn apparatus, and much more economical. We have had no difficulty with the snow to amount to anything. The only condition that has interfered at all has been ice with about two inches of snow on top, but that has been only an incident in 21 months of very satisfactory service."

W. N. AVERY, Fire Chief.

* * *

Minneapolis, Minn., March 12, 1912.

"We installed on Oct. 1, 1911, one motor auxiliary wagon carrying 10 men, 800 feet of hose, two chemical tanks and 300 feet of chemical hose, and one motor combination hose and chemical wagon, which, with the severe winter experienced, have done everything promised. We have had them in mud and snow and have never had any failures from fault of the machines. Last Friday night the City Council authorized the purchase of two more combination motor wagons of one make and one motor combination hose and chemical wagon of another make. We expect in the near future to assemble one combination wagon at our department shops and will probably purchase two more combination wagons before the summer is over. This department will be motorized as fast as possible. We are well pleased with the rigs we now have and find that motor apparatus is the only means of keeping up the efficiency of the department at a minimum cost."

C. W. RINGER, C. E., Fire Chief.

* * *

Johnstown, Pa., March 19, 1912.

"We have had one motor combination chemical in this department for 16 months, and have had very good results with it. The machine has never failed to start, and is always on the ground in remarkable time. We have run this motor appartaus all winter long through all kinds of weather, and have responded to some fires with 12 to 15 inches of snow on the ground. The machine simply ran away from the horse drawn apparatus, which was hung up in the snow with horses completely done out. We get more efficient service with the motor at one-fifth the cost of horse drawn apparatus."

L. M. KELLER, Fire Chief.

The Committee on Finance of the United States Congress is considering a petition asking for a reduction of the duty on sprocket chains. American manufacturers are opposing the reduction.

Poor horse service caused the mail contractor in Rochester to have his contract cancelled recently. Five electric wagons are now on the job.

A motor patrol in Tacoma, Wash., has missed only 14 days during a service totaling 34,000 miles, and is still apparently as good as ever.

Spokane, Wash., had upwards of 60 motor wagons in service in February.

Kansas City, Mo., had 256 motor wagons in service on January 1, 1912.

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The Price of Gasoline.

Recent Increases Tax the Industry, But Not Enough to Hurt Much.

GASOLINE advanced in price one cent a gallon—from 11 to 12 cents—on February 26 last, and now stands at 3 cents a gallon higher than it cost five months ago when the bottom price of 9 cents was reached. Three years ago the price was 12 cents, when the gradual drop to 9 cents began on account, it is alleged, of overproduction. It is said that the increased cost of the refined product is in sympathy with that of crude oil which advanced some time ago, and that at 12 cents the price of gasoline is now correctly adjusted to the cost of crude oil at present market prices.

* * *

Aggregate Figures.

To the small individual users of gasoline motor wagons this small increase in the price of fuel is comparatively insignificant, but when the figure is contemplated in the aggregate it assumes apparently alarming proportions.

On the basis of gasoline consumption and vehicle mileage of motor wagons in Chicago, a raise of one cent per gallon in the price of gasoline means an increase in operating cost of $1,500 a day for all of the users of motor wagons in this country. If we count 300 working days to the year, this means an added expense of $450,000 a year. For an increase of 3 cents a gallon—the difference between the price of 5 months ago and the present time—the yearly aggregate increased expenditure is $1,350,000.

* * *

Fleet of Fifty.

Of course this immense extra expense is borne by about 7,000 individual users. It will be more to the point, therefore, to consider a fleet of 50 machines having an average load capacity of 3 tons each and doing a daily average mileage of 50 miles per vehicle. Such fleets are not at all uncommon, and lest the mileage to some may seem excessive, it may be pointed out that there is one very well known concern that does an average of 63 miles a day with each of its 58 machines, as proved by indisputable statistics recorded daily over a period of years.

A good 3-ton motor wagon will average 5 miles to the gallon of gasoline in everyday service on fairly good roads in a flat city like Chicago. This is in accord with our own observations and records, and is verified by A. P. Lee of the Peerless Motor Car Co. of Illinois. Such a machine, then, will consume 10 gallons a day under the conditions assumed, and 50 machines will use 500 gallons of gasoline a day. An increase of 3 cents a gallon in the price of gasoline means $15 a day for the fleet of 50 machines, or $4,500 a year. The owner of a single machine would have to pay $90 a year for the 3 cent difference in the price of his fuel.

* * *

Will It Hurt the Industry?

Will this increase in the price of gasoline hinder the development of motor wagon use and application? We hardly think so.

In Great Britain the price of gasoline—or "petrol" as they call it over there—is usually about 50 per cent higher than it is in this country, and in many ways the use of motor vehicles is far more advanced there than it is here. For instance, there are about 1,700 motor buses and 8,000 taxicabs in London, besides a dozen or so fleets of motor wagons of 50 or more in each, and many hundreds of smaller installations. If the motor wagon can establish its economy in London with gasoline at 16 to 18 cents a gallon, surely an increase of 3 cents (from 9 to 12 cents) a gallon is not going to hurt the industry in this country to any marked degree.

Take the case of one big omnibus company in London which has a fleet of about 1,500 machines, averaging 60 miles, or thereabouts, a day each. If the price of gasoline in London were cut down to what it is in New York, the London motor bus company would save no less than $400,000 a year, in the cost of fuel alone. So it would seem that even with gasoline at 12 cents a gallon there is still left plenty of margin for the motor wagon to beat the horse.

AN APPRECIATION

New York, February 26, 1912.

To the Editor of The Power Wagon:

In the press of unusual work at this season of the year, I did not have an opportunity before yesterday to examine your special show issues. I was indeed surprised and gratified to note the interesting character of the contents of these two special issues and particularly pleased to observe the immense amount of care which you bestowed on the co-ordination of the specifications of American builders of commercial motor vehicles. These two show issues are not only valuable to anyone interested in either the selling or the use of commercial motor vehicles, but they form a contribution to commercial motor vehicle literature which, in the writer's judgment, makes them almost classical.

INTERNATIONAL MOTOR COMPANY.
R. W. HUTCHINSON, JR.,
ADV. & PUB. MGR.

MOTOR WAGON PARADE IN NEW YORK.

The New York Motor Truck Club has arranged for its second annual parade to take place on Saturday, April 13. It is expected that fully 500 motor wagons will take part in the parade.

$50,000 FOR FIRE MOTORS IN CINCINNATI.

Cincinnati has under consideration the raising of $50,000 by a bond issue in order to motorize the fire department. Five motor engines and some other apparatus will probably be purchased.

Paraguay has removed the duty from motor buses.

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Snows Are Trade Boost.

Power Wagons Establish Superiority over Horse in Snow and on Icy Streets.

THAT THERE is nothing like a good old fashioned snowstorm for showing the absolute incapability of the horse to "deliver the goods" when it is most needed, has been proved time and again during the inclement wintry weather of the past few months, and by the same token the power wagon has demonstrated conclusively that it is decidedly "on the job" under even the most adverse of climatic conditions.

From all points come reports of the successful use of motor wagons under road and weather conditions that stalled horse drawn wagons or even prevented horses from being sent out on the roads. And several instances were brought to notice of wideawake motor wagon dealers who seized advantage of the opportunity to consummate sales by giving demonstrations in the worst parts of the blizzards which have on at least five different recent occasions completely demoralized all ordinary kinds of transportation in this part of the country. Many were the inquiries concerning motor wagons which were received from merchants whose horses had both literally and figuratively "fallen down" and whose transportation service was consequently demoralized. Dealers were kept exceedingly busy during the blizzards, and all of them had reason to ruminate with much satisfaction that "it's an ill wind that blows no one any good."

The following instances, culled from various sources, show that the power wagon truly came into its own during the recent snows.

Milwaukee's Experience.

The horse surely met its Waterloo as a medium of transportation on Monday and Tuesday—says the Milwaukee "Free Press" of March 3, 1912—and while it succeeded in regaining some of its prestige during the week, the motor truck was king all the time for reliability in going to the freight depots and encompassing the snow barriers in the business district. The mail wagons of the postoffice ran on schedule time. The 3- and 5-ton motor trucks of the breweries never lost a trip between the shipping district and the freight depots. The great platform motor wagons used in the commission district likewise overcame all obstacles in delivering to the retail trade, and altogether it was a triumph for the motor driven vehicles.

An unusual instance was noted on Grand avenue on Thursday. A coal wagon with a 4-ton load, drawn by three horses abreast, turned from a side street into Grand avenue and took possession of the street car track. Before it had gone two blocks, Wells street and Twelfth street cars had formed a procession for a block. Behind the street cars was one of the 5-ton motor trucks in the service of a brewery, loaded with 51 half-barrels of the amber fluid, bound for the Northwestern depot. Taking in the situation, the driver of the brewery truck wheeled into the unoccupied track to his left, sped his big load ahead of the procession while there was a clear track, and took the right-of-way after reaching the steaming trio of Percherons tugging at the old-fashioned wagon.

This is only one of the many instances that came to the observation of business men in the downtown section during the week, and many conversions were made by the wonderful performance of the trucks in use by competing firms. In some cases, during the week, large firms employing from 8 to 12 two-horse wagons, had

A G.V. electric in the service of a Holyoke, Mass, concern, bucking the snowdrifts.

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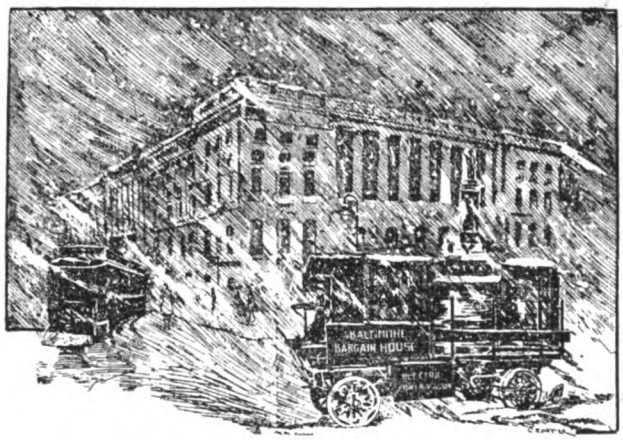
Tired out, and taking a rest. The motor wagon never gets tired.



Electric Power Wagons

WERE NOT HAMPERED BY FRIDAY'S SNOWFALL

HORSES WERE

Was your delivery service thrown into chaos by the storm? If so, you can realize more clearly the great advantage of Electric Vehicles that are not affected by snow, rain or any other climatic conditions.

Friday was terribly hard on horses, they were down all over the city, yet did you see any Electric power wagons disabled? They went right ahead as though it were a balmy spring day.

This applies to all of the Wagons in use in this city.

This is not the only season when horses work at a disadvantage. Remember that terrific hot spell last July, when over four hundred horses were killed or overcome in Baltimore?

Why not eliminate this uncertain phase of your business? Supplant your horse equipment with Electric Power Wagons and effect a decided saving in time and money.

700, 1,000, 2,000 pounds, 2, 3½ and 5 tons capacity.

The Gardiner Dairy have recently purchased five three and one-half ton trucks, making six of this size to be used by them.

Get in touch with our Vehicle Department for full details and a demonstration.

ELECTRIC DIVISION

THE GAS AND ELECTRIC COMPANY,

Garage, 30 South Eutaw Street.

A timely advertisement which appeared in the Baltimore papers a few weeks ago.

less than half of them in service because of doubling their horses into four-horse outfits to enable them to continue delivery. The uninterrupted schedule of those having motor wagons in service set many of the big firms to thinking about and discussing the truck question. The storm and blizzard marked the beginning of a triumph for the motor truck manufacturers in Milwaukee, and more applications for information regarding the big service vehicles were received during the week than during the past year.

* * *

Broke the Road for Horse Wagons.

I. W. Bullard, manager of the wholesale meat department of Swift & Company's Milwaukee branch, was exceptionally well pleased over the performance of his Packard motor wagon during the snowstorm of February 26, according to the Milwaukee "Evening Wisconsin." The big machine made its trips on schedule time throughout the entire day, carrying normal loads and delivering meats where teams and other conveyances found the roads impassable. In many sections of the city the motor wagon broke the roads for milk drivers and teamsters.

* * *

Makes Sale In Blizzard.

Because of its hilly condition Grand Rapids has been slow to adopt motor delivery. A representative of the Grand Rapids Auto Company called on a prominent retail merchant. Outside a blizzard was raging. The automobile man proposed to demonstrate a Flanders "20" delivery wagon. The business man called him a star comedian.

"Tell you what I'll do," said the Flanders "20" exponent. "I'll take you and a full load up Bridge street hill right now, if you'll buy two cars at the top."

"You're on," was the laconic response.

The dealer had the Flanders "20" at the door. He loaded it with five men and enough pig-iron to bring the total cargo up to 1,125 pounds. Then he simply drove up the hill, without even a pause.

The business man reached into his pocket and produced a check book and a fountain pen. Just $1,600 changed hands without a word of comment.—Detroit "Free Press," March 3, 1912.

* * *

Worth $100 to Make Deliveries In Storm.

"I'm convinced that the storm that tied up the city yesterday was a great test for motor trucks," said W. J. Zucker. "If that Ford delivery wagon I recently got of T. J. Hay did not make 'em sit up and pay attention on the row yesterday I'll miss my guess. It was worth $100 to me in making deliveries in that storm."—Chicago "Post," February 22, 1912.

* * *

Motor Wagons Play Good Samaritan.

A new method of demonstrating the efficiency of motor trucks has been adopted by Pierre Schon, manager of the International Motor Company, 1807 McGee street. For two days he has had a 2-ton truck stationed at the foot of the Westport hill and another at the foot of the Broadway hill. When drivers of teams tried in vain to pull their loads up the slippery streets the truck drivers attached the wagons to the back of the trucks and had no difficulty in drawing the wagons to the top. The two Mack trucks used have come to be known as the "Mack Samaritans."—Kansas City (Mo.) "Star," March 3, 1912.

* * *

Remarkable Cross-Country Trip.

J. E. Cunningham and Fred Bradbury of J. W. Maguire's truck department that completed a run from Boston to Brattleboro, Vt., early last week in a 5-ton Pierce-Arrow truck, arrived back in Boston last even-

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Courtesy of Chicago "Daily News."

A common occurrence on Chicago's streets during the recent wintry weather.

ing. Taking everything into consideration it was a remarkable performance, owing to the condition of the roads and the amount of snow the truck had to plow through in western Massachusetts and Vermont. The road to Worcester was a sheet of ice most of the way, but the Pierce truck got through without the use of chains. Demonstrations were given in Worcester, Springfield, Greenfield and Brattleboro. The trip to Brattleboro, Vt., a distance of 163 miles, was made in 14 hours 28 minutes on 39 gallons of gasolene and 5 pints of oil, the average speed being 11.4 miles an hour. The roads between Greenfield and Brattleboro were covered with snow two or three feet deep.—Boston "Record," February 8, 1912.

* * *

Only Conveyances Able to Plow Through Snow.

The last two weeks here in Marion the Indiana motor trucks, made by the Harwood-Barley Manufacturing Company of this city, demonstrated their superiority in the cold, snow and ice when street car traffic was at a standstill, cars off the track, big interurbans and Pennsylvania trains stuck in snow drifts, while the Indiana motor trucks plowed right through the big snow drifts, went everywhere and every day during the severest storm and blizzard this city has experienced in many years, were on the job every minute from 10 to 14 hours every day, and were practically the only conveyances that were able to plow through anywhere.—Marion (Ind.) "Chronicle," March 2, 1912.

* * *

Too Much for the Horses.

The blizzard of a week ago yesterday held no terrors for Buick power wagons, as the following letter received by F. W. Stewart, manager of the truck department of the local Buick branch from Adams & Pigott Company shows:

"Yes, we had a Buick out on a trip Wednesday. The storm was so fierce we hesitated about sending out our motor truck or horses and wagons; however, we decided it would be a good experiment, so we sent out three trips.

"One horse and wagon went south on our Hyde Park route; about 1 o'clock the driver telephoned that it was almost impossible to continue. The horse, a very spirited animal, was so worried by the storm that it was impossible to leave him alone and difficult to control him, so we ordered the driver to stop the trip and come in.

"Another horse and wagon went from our factory north to the city center. At one of the stops, under cover of the storm the horse and wagon was stolen. It took the rest of the day and the aid of the police department before we located it.

"The Buick truck started at 8:30 a. m. on one of the most difficult trips in any weather, to Rogers Park and Edgewater. It covered 40 miles—made all the stops and was back at 1 o'clock. The driver had no difficulty in getting around. He passed a number of vehicles stalled in the storm, but our Buick stood the test without any trouble.

Taking the inside to pass the horse traffic—a street scene in New York during the recent winter.

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"The Buick truck did more than we expected—indeed, it did so well that comparing it with the absolute failure of our horses and wagons we have decided, as soon as convenient, to change over entirely to Buick motor trucks."—Chicago "Inter Ocean," February 29, 1912.

* * *

Extra Loads for the Motor Wagons.

Echoes of the big storm in Chicago ten days ago, when the electric lines, elevated railroad and steam roads were put out of business by the blizzard and gale, came to mind as the wind began to pile the snow up in the streets of Milwaukee last Monday. The report that all methods of transportation with the exception of the motor wagon service in the wholesale district had been abandoned in Chicago was believed to some extent but not wholly. When the same conditions confronted the business men of Milwaukee last Monday and Tuesday, and since, those operating power wagons for delivery, as well as those who still adhere to the horse-driven vehicle, sat up and took notice, observed and are now pondering over the result of their investigation.

"How did you come out with your motor truck today?" asked a Broadway commission merchant of one of his competitors on a Farwell avenue car last Monday.

"We never lost a trip, but we were an hour and fifteen minutes late. I think that is remarkable."

"So do I," said the inquirer, "but it is hard to believe unless you lightened your load."

"On the contrary," said the truck owner, "we were compelled to extend the loads because you fellows could not deliver."—Milwaukee "Wisconsin," March 2, 1912.

* * *

Chicago Motor Buses Run on Schedule.

"The performance of motor trucks in Chicago during the recent blizzards proved their worth," said Manager James Plew of the Chicago White branch recently. "During the storm of February 21, with the thermometer at 18 degrees, and the wind blowing more than 55 miles an hour, street, elevated and steam roads in and around Chicago were tied up. The fleet of 12 White motor passenger buses running from the Northwestern depot to Marshall Field's and Mandel's, ran on their regular schedule without any delay whatever.

"The work of the buses marks a new chapter in the adaptability of the automobile to meet transportation problems in all sorts of weather."

* * *

Large Wheels a Help in Snow.

V. H. Perrill, manager of the Motor Service Corporation, Chicago, advises us under date of March 14, 1912, as follows:

"We have been running right along from 10 to 14 Mercury 1,000-pound trucks daily and have made all our regular trips with very few exceptions. The large wheels and great road clearance of the Mercury trucks has enabled us to get through the drifts without any serious difficulties.

"It was a Mercury that broke the road between Hinsdale and Elmhurst immediately after the blizzard on February 21. One of the Mercuries made a special trip from Joliet during the worst of the storm and came in with very little delay. When the temperature went down to 12 to 16 degrees below zero for several days, we used as much as half kerosene in our lubricating oil to keep it from stiffening. No other preparations or precautions were necessary, the Mercuries being air-cooled and therefore without pumps, water jackets or radiators.

"In conclusion would state that snow, ice and extremely low temperature did not trouble us to anything like the extent that it did the horse-drawn vehicles. It would have been impossible for horses to have made the regular routes which the Mercuries covered, to Lake Forest, Hinsdale, Elmhurst, La Grange and other outlying suburbs."

* * *

Never Missed a Trip.

J. Teaford, superintendent of The Hub store, Chicago, under date of March 12, 1912, advises us as follows:

"Have just received the February reports for the seven motor wagons running, and on looking over them I find where none of them have missed a trip on account of the snow and blizzards which we have had for the past 30 days and have been satisfactory in every respect."

* * *

Horses Played Out.

George B. Smith, manager of the Chicago branch of the Ward-Corby Company, gives an interesting comparison under date of March 9, 1912. Says Mr. Smith:

"During our snow time this winter, and we have had a whole lot of snow, our electric motor wagons have given us practically no trouble at all. I do not mean that we never had to tow in a car, because we have occasionally, but not enough so that we have considered it any disadvantage. On the other hand our horses have played out, and we find about this time of the year they are looking rough and as though they had been badly treated, and, as a matter of fact, we have tried to take the best kind of care of them. When one is using electric cars it saves that much worriment and trouble, for we know that the machine will not lose flesh, and after a hard day's work, a good warm garage and a fresh supply of electricity starts it off as good as ever."

* * *

Better in Winter and Summer.

Gimbel Brothers, of Philadelphia, have 11 motor wagons in service. In a communication dated March 11, 1912, L. Gillingham says: "Most of the equipment works 23 hours daily, and we find the machines more advantageous than horses during the heavy snows in winter and the hot weather in summer."

POWER WAGONS FOR UTAH MINERS.

Ralph W. Cavanaugh, of the Mack Motor Truck Company, of Chicago, has been investigating the practicability of power wagon service for miners in the Red Hills of Utah. As soon as the lessees at Ely have 500 tons in sight a motor wagon will be put into operate between Currie and the mines. In the opinion of Mr. Cavanaugh a 5-ton truck can successfully make two round trips in three days, taking five tons of ore to the railroad on each trip out. There are no serious difficulties to be overcome to make the road such as to permit a good average speed to be made either with or without a load. The distance from the mines to Currie is 80 miles, with the greater part of it in the valleys where the grade is not steep.

Six hundred fire commissioners and chiefs have visited Springfield, Mass., during the past six months, to inspect the motor fire apparatus there.

Birmingham, Ala., has introduced the innovation of drawing a fire engine by a combination motor hose and chemical wagon.

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Snow Removal.

A Limited But Profitable Field for Municipal Motor Wagons of Special Design.

AT A CONSERVATIVE estimate, the removal of snow from the business streets of the cities and towns of the United States costs the local administrative bodies somewhere in the neighborhood of $5,000,000 each winter, for only a few days of actual work. The table given herewith, which is compiled from official statistics furnished by the street superintendents of the places named therein, shows that 16 cities have up to the middle of March spent upwards of $1,000,000, with the end of the winter* not yet in sight. And the figures given include only the cost of extra hired teams and help, and do not take into account the permanent vehicle equipment owned by the cities themselves, and the administrative costs. So that our estimate of $5,000,000 for the whole country is certainly not very far out of the way.

When it comes to the calculation of the amount of snow that has fallen this winter up to date, the figures are so stupendous as to be almost meaningless. In St. Louis alone the calculated amount up to March 3 is upwards of 37 billion pounds. But as only a comparatively small percentage of the snowfall is removed by human agency, and as local conditions, from both a business and a climatic standpoint, are so various, the economic aspect is best considered by basing calculations on the total amount of money expended—$5,000,000.

* * *

Snow Removal Is Costly and Inefficient.

It is certain that a very large portion of this money is absolutely wasted, for the vehicles and men available for this kind of work are for the most part of the "tag rag and bobtail" order, the out-of-works and leftovers from more remunerative employment. Always the snowstorms come when no one is prepared for them. When they do, there is the usual hurry-up call for wagons and men; the politicians rush around to find who among their constituents needs a job; the lodging houses empty the least fortunate of their habitués; and a motley array of unfit men and more or less efficient teams pour forth to earn the comparatively big rewards for cleaning away the snow. To many of these a snowstorm is a regular windfall, a piece of luck to be prayed for and made the most of when it comes. Small wonder, then, that the price comes high to the cities for this kind of assistance. Yet still it happens, year after year;

*Chicago had a 6-inch snowfall on March 20, with a prospect of more to follow.

Questions. Answers—	New York City, New York.	St. Louis, Missouri.	Baltimore, Maryland.	Chicago, Illinois.	Cleveland, Ohio.	Providence, Rhode Island.	Philadelphia, Pennsylvania.	Worcester, Massachusetts
Total miles of streets	3134	930	600	2896	1200	253	1181	215
Miles of business streets	(?)	Snow removed from 20 miles of streets.	50	(?)	100	Snow removed from 13 miles of streets.	75	20
Inches of snow this winter, to date	23.3 (March 14)	47.3 (March 3)	22.4 (March 14)	29.3 (March 11)	55 (March 12)	36½ (March 11)	19.8 (March 15)	—
Total cost to city of snow removal, to date	$750,000 (March 14)	$70,000 (March 12)	$59,978.50 (March 14)	$58,725 (March 7)	$12,845.80 (March 12)	$12,466 (March 11)	$10,851.44 (March 15)	$9,600 (March 11) snow and ice.
Number of wagons employed in snow removal, daily	1800	400–600	150	250	125	80	60	32 horses owned by city. Some hired.
Average price per day paid per wagon for snow removal	Contract. Some trucks paid $7.00 per day.	$4.00 per day of 8 hours.	$3.00	$5.50 (wagons) $3.75 (carts)	$4.50	$4.50, double team, per day of 9 hours.	89 cents per load.	$5.00
Number of motor wagons used in snow removal	—	Officials use 3 motor cars.	None.	None.	None.	None.	None.	None.

	Hartford, Connecticut.	Newark, New Jersey.	Waterbury, Connecticut.	Fort Wayne, Indiana.	Lexington, Kentucky.	Holyoke, Massachusetts	South Bend, Indiana.	Elizabeth, New Jersey.
Total miles of streets	130	350	92	250	70	85	55 paved	100
Miles of business streets	15	20	7	5½	10	47	4	25
Inches of snow this winter, to date	22.6 (March 11)	27.25 (March 11)	17.32 (March 11)	43 (March 12)	(?)	24	77½	—
Total cost to city of snow removal, to date	$7,231.29 (March 1)	$6,228.88 (March 11)	$6,182.28 (March 1)	$1,100 (March 12)	$1,000	$930	$700	$100
Number of wagons employed in snow removal, daily	10–30	50	3 doubles 1 single 2 trolley cars	60	8	3	15	6 owned by city.
Average price per day paid per wagon for snow removal	$5.00, doubles; $3.50, singles. 8 hours.	$4.41	$5.00, doubles; $3.00, singles.	$4.50 per day of 10 hours	$3.50	$4.50	$4.50	—
Number of motor wagons used in snow removal	None.	None.	None.	None.	None.	None.	None.	None.

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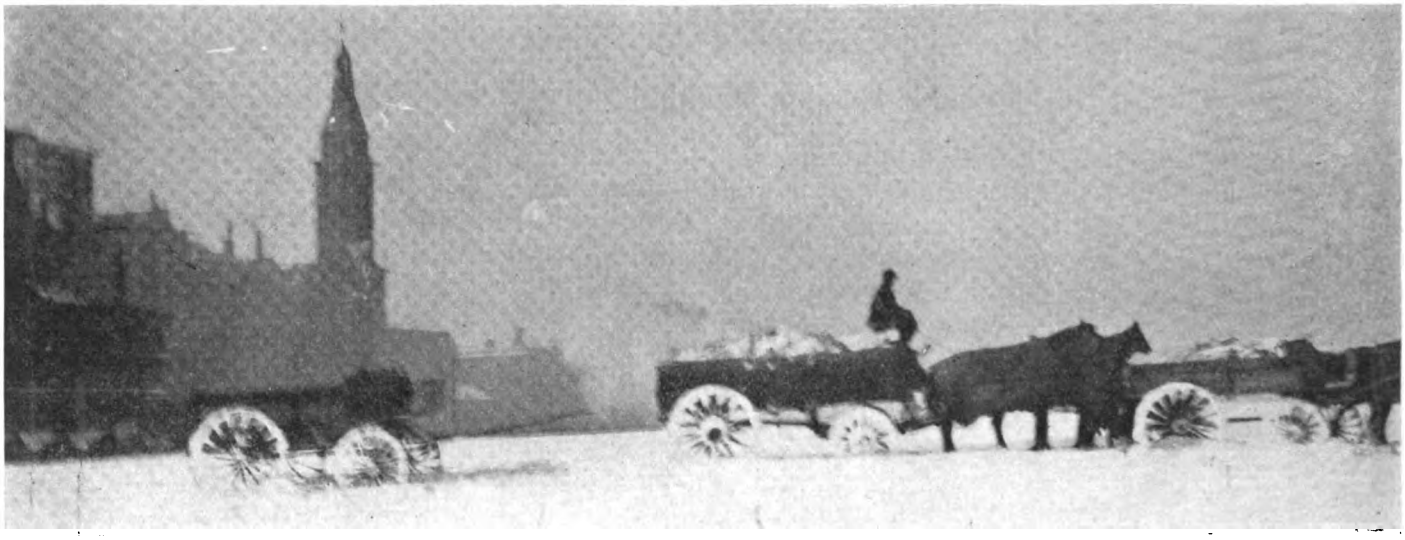

Going to the lake front, from Michigan Avenue, Chicago—one snow cart stalled in the drift.

the same old gangs, the same old teams—or, rather, what is left of last winter's bunch added to the derelicts of another year.

As the St. Louis "Globe-Democrat" of March 4 rightly says, most of the men employed in this work are transients, and "soldier" on the job. Poor fellows! Many of them are physically unfit for even ordinary labor, much less for such hard work as shoveling snow in the face of a blizzard, and then one can hardly blame them for wanting to make the job last as long as possible.

* * *

Machine Methods Would Effect Big Saving.

What has all this to do with power wagons? one will ask. The answer is that if and when this inefficient method of handling the snow removal can be replaced by machine methods, there will be a considerable saving in that $5,000,000 now expended every year, besides a quicker and better job—meaning vast economic savings in transportation.

There are two obstacles at present in the way of introducing machine methods—the fact that a heavy first expenditure is needed for apparatus that apparently can only be used for a few days each year, and that the work of snow removal is largely considered as a charity to the unemployed.

This outfit needed an extra pair of horses to pull it out of a few inches of snow. Note the small load carried.—A scene after a recent snowfall in Chicago.

The second of these objections can quickly be dismissed. If the city officials must find work for the unemployed, let them find something that will be more remunerative to the city than paying ill clad and physically unfit men $1.50 or $2 apiece for a day's work which a properly equipped machine could do for a few cents, and let that something not subject the men to the dangers of pneumonia and other complaints so easily acquired from exposure to the wintry elements.

* * *

Suggestion for the Use of Motor Equipment.

The other problem is more difficult, yet not insuperable. All that is wanted is for some progressive city to make the start and the others will soon fall in line, if the politicians will let them. The chief difficulty, of course, is to provide motor equipment that would be suitable for snow removal and that could be kept doing something or other of a profitable nature the rest of the time. In another part of this issue is an instructive article, "Motor Wagon for Road Repair," by Logan Waller Page, that points the way. Mr. Page describes a motor wagon with attachments designed by William P. Kennedy for doing all sorts of operations in connection with road building and repair. Suppose a city of the size of St. Louis should acquire 10 such machines. The total cost with all the auxiliary apparatus required would not exceed by much the expense of snow removal in that city for this winter only. St. Louis up to March 12 has spent $70,000 for snow removal. It is said that this amount is greatly above normal. Let us base our calculation, then, on a yearly expenditure of $25,000 and assume the cost of hired labor at $10,000. (The city uses 200 of its own wagons, by the way.) That leaves $15,000 a year, which, capitalized at 5 per cent, gives $300,000 available for the purchase of special equipment. This is several times as much as is needed for the purpose we have in mind.

Ten such machines as Mr. Page describes, or ten gasoline power wagons of equivalent capacity, could be adapted for use in snow removal, and would prove sufficient to handle any normal snowfall in St. Louis.

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besides decimating the cost for man labor. In times of extraordinary blizzards, of course, they could be reinforced by hiring as many extra men and horse wagons as might be needed.

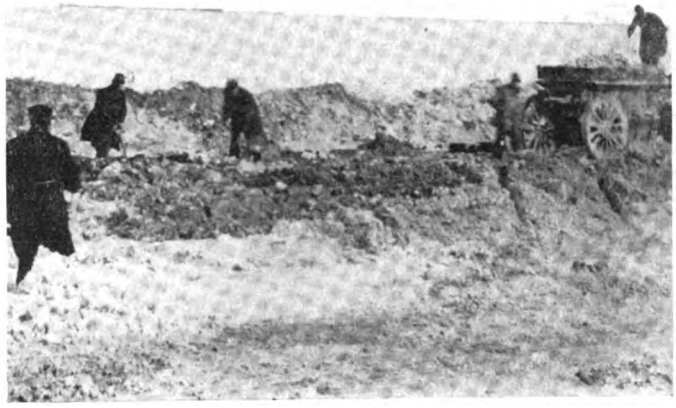
* * *

How Power Wagons Can Be Used.

There are many special ways in which the machines could be adapted to the work in question. Here is one suggestion:

Fitted with plows, or rotary sweepers, or even flat sweep boards in front, they could brush the snow into the gutters and so quickly free first one side and then the other side of the middle of the street from snow, and thus relieve the hindrance to traffic. With the snow piled up into rows or hillocks, a power-operated loading device on one or more of the machines could quickly load the snow into the bodies of other trucks, and possibly also into trailers, if such were used, and with practically no delay the loaded vehicles could start off for the dumps. A judicious distribution of trailers and efficient routing of the machines would cut down the inoperative time of the apparatus to a minimum, and only a few men would be needed to round out the work of the machines.

Such municipally owned motor wagons could be used during the rest of the year for garbage collection, road building and repair work, and general hauling. If a municipality for some reason or other did not care to buy motor equipment, it could let out the work to a contractor, stipulating the type of apparatus to be used and the price to be paid. In any case the work would be better and quicker done, and the cost cheaper, than obtains under the present slipshod "systems" now used in the majority of cases. The successful experience of Liverpool, England, and Paris, France—to select two examples at random—goes to show that municipal motors pay handsomely for just such work as we have indicated, even with much cheaper labor and more expensive fuel than we have in this country. For instance, one type of motor street sweeper and sprinkler used in Paris does as much work as 10 horse drawn sweepers or 100 hand sweepers, and it is not so powerful as the gasoline-electric machine designated by Mr. Kennedy.



One of the snow dumps on Lake Michigan, Chicago. Snow shovelers at work.

* * *

How They Handle the Snow in St. Louis.

To say that all cities in this country are inefficiently administered in the matter of street cleaning, considering the equipment at their disposal, would not be telling the truth. St. Louis is one of the bright exceptions. James C. Travilla, Street Commissioner of this city, gives us the following interesting report of the work of his department, and as his remarks will undoubtedly prove of value to many others, we print his report in full:

"The Street Department of St. Louis after a heavy

A scene at one of the dumps in St. Louis, showing the snow trap leading to the sewer.

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snow endeavors to clean up all the main thoroughfares in the central business district and the street intersections at important transfer points.

"The successful handling of snow depends upon an efficient organization and a sufficient number of men and teams to properly handle the work. It was formerly the practice to haul the snow from the central sections to the river front, a distance of more than a mile. To overcome the difficulties of congestion at dumping places along the river and to shorten the haul, I deemed it advisable to install a number of snow dumps over large sewers at convenient points to that part of the city cleaned. The result has been that the cost of handling snow has been materially reduced and the time required for cleaning shortened.

"The snow dumps or traps are about two feet in width and seven feet long, provided with a temporary trap door that may be closed when the team is driving over the opening. In each snow trap was installed a four inch water pipe and the water discharged from this pipe through a nozzle prevents the dumps from being clogged with snow and ice.

"In organizing the force for the removal of snow, each foreman with a sufficient number of men and teams is assigned a station with instructions to have his men and teams report there after each heavy snowfall. The result has been that there is no confusion in beginning operations that have brought about pleasing results to the teaming interests of the city. The amount of money spent for this particular branch of work varies from $1,500 to $4,000 per day, depending upon the depth of the snow to be handled."

MUNICIPAL MOTORS IN BUENOS AYRES.

Buenos Ayres, the wonder city of South America, has installed a motor wagon service for collecting material dropped from vehicles, public market refuse, etc. These power wagons, which form part of a fleet of Latil avant-train front-wheel-driven machines, are held in readiness to answer telephone messages made by the street inspectors for the service indicated. The city has also 11 motor vans for postal collection and delivery, as well as 30 machines for the use of the Municipal Public Health Board.

Springfield, Mass., has invested over $100,000 in motor apparatus for its various city departments—about $1.20 for each inhabitant.

Pennsylvania Railroad officials in Harrisburg are considering the use of motor wagons in their transportation service in that city.

The city government of Boston, Mass., has 62 motor vehicles in service, of which 22 are used by the Department of Public Works.

Reading, Pa., is soliciting public subscriptions for the purchase of a motor ambulance.

NEW YORK ASKS FOR BIDS ON FIRE MOTORS.

Proposals for supplying 31 pieces of motor fire apparatus to the Fire Department of New York were advertised for on March 22, by Fire Commissioner Johnson, the bids to be opened April 1. The apparatus to be bought constitutes the largest purchase of such apparatus made by New York, and probably by any city to date. It consists of:

26 combination chemical and hose wagons, of "Scout" type, 32 H. P. or more, with two 35-gal. tanks, 300 ft. 1-in. hose, and steel bodies to carry 1,200 ft. 2½-in. fire hose and full complement of men; delivery in 240 days.

3 high pressure hose wagons, 45 H. P. or more, with steel bodies to carry 2,100 ft. 3-in. hose and full complement of men and fire equipment; delivery in 120 days.

2 hose wagons without chemical attachments, 40 H. P. or more, with steel bodies to carry 1,500 ft. 2½-in. hose and full complement of men and fire equipment; delivery in 120 days.

All the foregoing must have four or six cylinder engines of four-cycle type, water or air cooled; have maximum speed of 30 m. p. h., be equipped with solid rubber tires guaranteed for 7,500 miles, and be guaranteed for three years under bond of 50 per cent of contract price.

These machines are intended for use in suburban districts and will be installed in the 21 new fire houses for construction of which contracts were awarded several months ago. The houses will be completed about the time the 26 scout wagons are ready for delivery. Plans for 21 other houses are now under way. The scout wagons will be the fastest pieces of apparatus in the department, as they will be required to show a speed of 35 miles an hour and climb the most difficult hills in the suburbs in the tests that will be made. When drawing the specifications for them, the Commissioner and the Apparatus Board kept in mind the fact that many fires in the suburbs can be extinguished with chemical engines before the arrival of horse drawn engines.

The New York Fire Department now has six motor hose wagons, of which four are of the high pressure type. These are located in lower Manhattan, two at 243 Lafayette street, two at 173 Franklin street, and two at 22 East 12th street.

Owing to the fact that there was an interval of only ten days between the advertisement for bids in the City Record and the date set for opening the bids, and to the further fact that very little publicity was given to the proposed purchases, the new Commercial Vehicle Committee of the National Association of Automobile Manufacturers issued a circular letter on March 23, calling the matter to the attention of all members of the Association believed to be interested in fire department vehicles.

The American Express Co. has installed a fleet of 18 motor wagons in its service in Baltimore.

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Maintenance Guarantees.

A Discussion on All Phases of a Much Mooted Subject.

By WILLIAM P. KENNEDY.*

IT IS SAFE to make the assertion that no manufacturer of motor trucks desires to guarantee cost of operation, and the suggestions advanced herein are not put forward with the idea of advocating maintenance guarantees, but rather to make evident all the essential considerations which enter into the project so that the manufacturer, knowing the problem from every angle of view, may be in better position to combat or forestall any insistence on the part of the prospective user to have his cost of operation underwritten.

So long as machines can be sold singly or in small groups there should be no urgent necessity for considering this question, but we are all anticipating a time, not far distant, where large installations of machines will be purchased on the basis of the economy to be effected by performing transportation with machine equipment as against whatever method may be at present in use to be superseded. These large installations are the ultimate desire of every manufacturer, and it is seldom that their purchase can be negotiated without one or more conferences between the executives of both the purchaser and the seller. At these executive conferences the question of relative cost of operating the new and the old equipment inevitably arises, and in view of the fact that until motor trucks have been longer in service there will always be question as to the correctness of the cost of operation as presented by the manufacturer in showing the economic advantages of his equipment, the purchaser will usually insist upon some assurance or guarantee that if he makes the investment the anticipated saving will be realized.

This condition may not prevail for many years, as it is rational to suppose that when the motor truck industry is upon the same stable basis with other lines of industrial apparatus and when motor trucks have thoroughly demonstrated their operating expense there will be no demand or necessity for operating cost guarantee. Nevertheless, since we must cross this period, it is well to have before us all that is involved in such an undertaking and the various schemes by which manufacturers can receive compensation for the obligation they assume, or release from such obligation when the user has sufficient actual experience with the apparatus to command his confidence. This can only be done by penalizing in some form or other the user who insists on the protection or by forcing him to pay such a large premium for this insurance as will induce him to release the manufacturer at an early date.

* * *

Essential Advance Provisions.

Before going into various ways and means for the accomplishment of this purpose let us consider some of the essential provisions which the manufacturer should insist upon before entering into any obligation for cost insurance.

He should thoroughly comprehend all the characteristics of the service in question, and this should be made evident in any form of agreement so as to be mutually understood and recognized by both parties. There should be an agreement as to the schedule of operation of the machines and the territory covered by such schedule, expressed or described with definite limitations, so as to provide against the prospective user enlarging his scope of operation in the event of increase in his business likely to occur wtih the employment of machines. This may be considered otherwise in that the manufacturer should insist upon knowing in advance all the characteristics of operation in such a manner as to protect himself against subsequent change in application of the machines without adequate compensation or to the possible detriment of his interest in the contract.

The manufacturer should insist upon nominating the garage superintendent for employment by the prospective user, with necessary provision for superseding this superintendent in the event that such might be desirable. He should also provide for exercising control over the superintendent of the delivery department or traffic manager, if such executive exists in the user's organization, in addition to the garage superintendent. This provision is necessary to restrict such delivery department executive against employment of the machines in a manner which might be considered abusive or detrimental to the manufacturer's interests with regard to cost of operation.

Another safeguard to be insisted upon in this direction is the right to veto the employment of machine operators whom the manufacturer may regard as incompetent to operate the machines with rational care.

Records of the performance of the machines should be kept and furnished daily or weekly for file to both parties in the contract. Records should likewise be kept of all garage operations with regard to maintenance and replacement of wearing parts. For the purpose of record keeping it may be advisable for the manufacturer to provide his own employes or to so arrange for payment for the services of a record keeper co-operatively with the user so as to insure absolute impartiality.

In determining upon the machines to perform the specific work in question the manufacturer should insist upon the right to specify the details of equipment so that the machines may be competent to perform the work in question, and for the proper maintenance and upkeep of the vehicles the manufacturer should also have the right to specify the garage equipment, at least in so far as relates to the machine shop or provision for care of the wearing parts.

*A paper read at the N. A. A. M. motor wagon convention, New York, March 5, 1912.

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It is occasionally necessary to insist that a definitely agreed maximum sum be expended on the upkeep of the vehicles at the option of the manufacturer so that the apparatus may be kept in satisfactory working condition and that the machines will not be allowed to operate in such run-down condition as would seriously influence the normal cost of upkeep.

* * *

Forms of Guarantee.

The amount of risk involved in the guarantee of operating cost is not nearly so formidable as it usually appears at first if the complete cost is analyzed in such a manner as to separate the known quantities from the unknown quantities. This will appear further. In presenting the cost of machine operation it is desirable to present it on an annual basis, with an account covering investment and an account covering annual operating expense. This annual operating expense should be subdivided into four parts, as follows: Fixed Charges, Maintenance or Upkeep, Garaging and Operation.

The Fixed Charges division should cover interest at the current rate on the entire investment and depreciation on that portion of the machine equipment which is not subject to mechanical wear in operation. The non-wearing parts only should be depreciated since the wearing parts are continually upkept and periodically renewed. It is safe to assume that the non-wearing portions of the equipment will give ten years' service and therfore a depreciation of 10 per cent per annum should be charged off to provide a fund for the repurchase of this part of the equipment at the end of 10 years.

The Maintenance or Upkeep division of the accounting should cover material for the upkeep and renewal of wearing parts and material for the upkeep and renewal of the tire equipment, as well as labor involved in the replacement or renewal.

The Garaging account should include the rental and other items covering storage and washing, the garage labor necessary for cleansing and care, fire insurance and supplies necessary for maintaining the machine in operable condition.

The Operation division should cover the cost of operators, helpers, accident insurance, the supply of gasoline and lubricating oil and other expenses incidental to the performance of the machine's service.

With the exception of the items set forth in the Maintenance division all of the other charges are well known and can be definitely settled upon in advance to the satisfaction of both parties to the contract, so that the unknown quantities are reduced to the expense involved for material and labor in the upkeep and renewal of the wearing parts and tires, and it is quite possible for the manufacturer by properly presenting analyzed cost in this manner to the prospective user to segregate the Maintenance items as the only ones requiring the necessity of insurance or guarantee by contract.

Assuming then that the wearing parts are the items to be guaranteed, the figures representing the annual charges for these items should have a liberal factor of safety against contingencies.

* * *

One of the ways in which guarantee might be accepted by the manufacturer is on a basis of receiving a percentage as a premium above the stipulated costs as recompense for the risk taken.

* * *

Another plan would be to compel the user to pay the manufacturer, weekly, monthly or otherwise, a proportionate amount of the annual charges for the maintenance so that in this plan the manufacturer would furnish at the premises of the user the parts required and the labor incidental to replacement at a fixed sum, which would be presumed to be above the actual cost, and the difference between the actual cost and the sum agreed upon would constitute the compensation for guarantee.

* * *

A method which has been successfully in operation is to have the maintenance and replacement executed by the user's employes and daily recorded with both parties, the difference between this actual expense and the maximum cost agreed upon in the contract to be equally divided between the manufacturer and the user. This plan has the advantage to the manufacturer that during the first year and probably the second year the rebate to be handed over by the user to the manufacturer will be a considerable sum and will probably induce him to discontinue the maintenance contract altogether.

This scheme has the further advantage over the one previously mentioned in that it provides for the user gaining at least a portion of the economy effected from machine service, and it will be recognized that the cheaper the cost of operation to the user the greater will be his influence in inducing other merchants to employ similar equipment.

* * *

Another plan in use is for the manufacturer to contract for the supply of material only (without labor) necessary for upkeep at a fixed annual sum with the provision that no other than the manufacturer's material shall be employed, and in this scheme only the actual material used can be charged for or the entire maximum sum agreed upon as the situation may warrant.

* * *

In some instances manufacturers have taken care of the guarantee situation by operating the machines from their own garages, where they have the maintenance and upkeep practically under their own control. This involves investment on the part of the manufacturer in a direction which he usually does not want to court, but particularly in cities adjacent to the manufacturer's plant this plan of operation has been worked out with satisfaction to both parties.

* * *

A final plan which would seem to be practically operable in such localities where the manufacturer may maintain service stations is to take care of an agreed

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cost of maintenance by furnishing upkeep and part renewal service at these service stations for a definite sum per annum. This scheme is best carried out by insisting upon the user providing, when the original installation is made, for an excess equipment of machines from 10 to 20 per cent, depending upon the severity of the service, and arranging to have this excess equipment constantly in the custody of the manufacturer at his service department so that by the use of it each unit of the operating equipment will be periodically and systematically inspected and overhauled at his service premises without interruption to the operation of a definite number of units. It is quite possible to make the user incur investment for this excess equipment and agree to its custody with the manufacturer since in any event he would be compelled to purchase excess equipment to insure reasonable operation, and by the plan contemplated he would be relieved from any investment at his garage in machine shop or other equipment, as well as labor and supervision, from which necessity he is relieved by the facilities afforded at the manufacturer's service department under such an arrangement.

The principal reason for insisting upon custody of the excess equipment at the service station is to prevent the user from employing this excess equipment in his regular service and thereby defeating the purpose for which this excess equipment is intended.

* * *

Tabulated Horse and Machine Costs.

The table attached hereto is furnished for the purpose of showing the amount of saving which it is usually possible to make in superseding horse equipments with machine equipments, and this amount constitutes the inducement which the prospective user has to make the increased investment called for with machines. This is the amount also which is involved in any consideration of guarantee and its substantial character will at once suggest the equity of giving to the manufacturer at least a portion of it wherever guarantees are insisted upon.

The cases shown are actual investigations made with adequate facilities and the machine equipment determined upon after considerable demonstration to the satisfaction to the prospective user of the actual advantages of its employment. These figures in every case have been agreed to by the prospective user as a true representation of his existing horse cost and expected operating machine cost with the physical demonstrations given.

Horses.	Machines.	Investment—Horse.	Investment—Machine.	Expense—Horse.	Expense—Machine.	Annual Saving.	Earnings in % of Investment.	Saving over horses in %.
HEAVY SERVICE.								
75	44	$ 94,551	$166,733	$136,746	$113,087	$23,660	14.2	17.5
30	11	26,615	36,584	44,198	28,378	15,819	43.2	35.7
16	5	7,975	17,784	15,587	11,557	4,030	22.6	25.8
121	60	$129,141	$221,101	$196,531	$153,022	$43,509	19.6	22
Relative Proportions—								
(1 : .5)		(1 : 1.70)		(1 : .77)				
MEDIUM SERVICE.								
35	31	$ 36,485	$ 83,003	$ 91,530	$ 70,663	$20,867	25	23
17	10	14,300	23,500	29,074	18,972	10,102	42.9	34
33	20	21,848	51,126	50,249	38,444	11,805	23	23.3
21	14	39,778	46,170	41,593	31,802	9,791	21.2	23.5
48	37	54,095	75,598	115,284	75,745	39,539	52.3	34.2
154	112	$166,506	$279,397	$327,730	$235,626	$92,104	32.9	28
Relative Proportions—								
(1 : .72)		(1 : 1.67)		(1 : .72)				

BRITISH ARMY MOTORS.

The following is an extract from the Memorandum of the Secretary of State for War for Great Britain relating to the British army estimates for 1912-13, which was issued as a parliamentary paper on February 26 last:

"The expansion of mechanical transport in the army will reduce the number of horses required for the Expeditionary Force to a considerable extent, but unfortunately the corresponding expansion in the civilian world threatens to lead to the disappearance of the 'bus horse, on which we have hitherto mainly relied for artillery purposes.

"During the past year steady progress has been made in the conversion of the third and fourth lines of transport from horse to mechanical transport.

"One depot company and 14 service companies of mechanical transport have already been formed with a nucleus of vehicles, leaving for completion in 1912-13 the four further companies required for the Expeditionary Force. Pari passu with the formation of the new mechanical transport companies, horse companies have been reduced so that in the autumn of this year the horse transport establishment will comprise only the exact number of companies required for three home depots, seven units abroad, and the forty units still required for the Expeditionary Force. The peace establishment of the mechanical transport companies has been fixed tentatively at eight vehicles (six lorries and two tractors), and it is anticipated that this establishment, in addition to its employment for training and maneuver purposes, will effect a considerable annual saving in expenditure on hired transport.

"Considerable progress has also been made with the registration of lorries for war requirements. A scheme of subsidies for vehicles which comply in certain respects with War Department specifications has been worked out, and will shortly come into force. In the meantime a provisional scheme for the immediate enrollment or lorries of a type approximately as nearly as practicable to army requirements has been in operation, and under this a considerable number of vehicles have already been registered.

"As regards personnel to meet the needs of the Expeditionary Force on mobilization, steps are being taken to enlist civilian drivers, preferably those actually engaged in driving the subsidized vehicles, into the Special Reserve."

Philadelphia has ordered a 2 ton, 40 hp., gasoline repair truck for the Northeast High Pressure Fire Main Service in that city.

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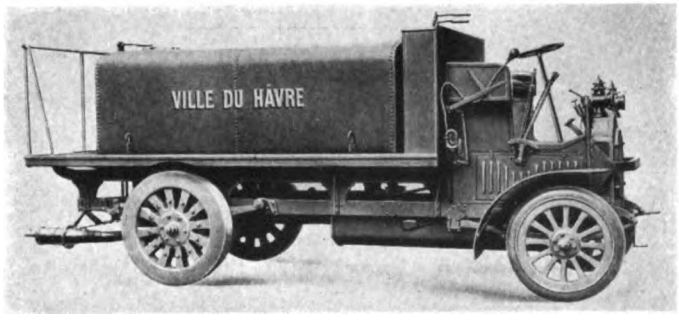
Motor Street Cleaners.

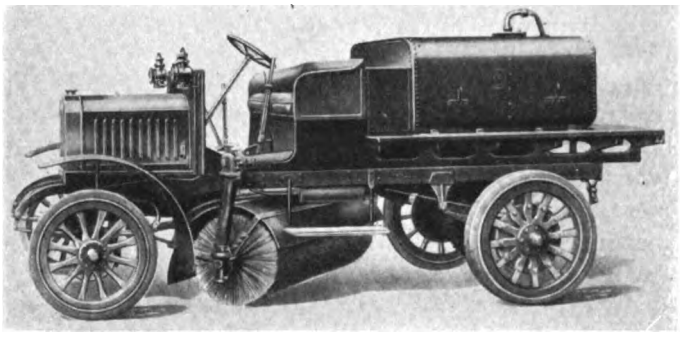
Some Interesting Municipal Motor Wagons Meeting With Favor in Europe.



First type of municipal motor wagon—with sprinkler alone.

THE DE DION-BOUTON automobile works have lately brought out several types of motor wagons which are especially designed for city street cleaning. One of these is a tank car used exclusively for watering, while another design serves for combined sweeping and watering. There is a third type which acts as a sweeper alone, but which is also fitted with a small water feed.

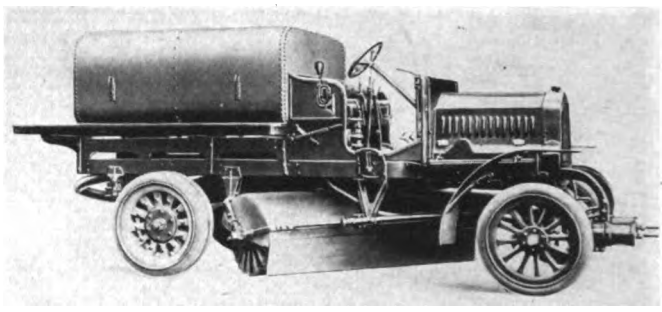
Of the heavy tank cars there are already a number in use in France, notably at Versailles, Havre and Deauville. This apparatus is mounted on the type of chassis which received a prize from the war department some time ago. Sidebars of wood reinforced with metal are employed so as to secure flexibility as well as strength.



Third type of municipal motor wagon—sweeper alone, with small spray in front of brush (no rear spray).

The gasoline motor is of the 4-cylinder vertical type with 4 inch bore and 5.2 inch stroke, and is rated at 25 horsepower. It is fed by an automatic carburetor, and the gas inlet to the motor is regulated by the driver by means of an accelerator pedal placed on the right. High tension magneto ignition is used, with spark plug. The driver throws the motor on or off by means of a pedal placed under the left foot. The gear box is of the sliding gear type and gives three speeds and one reverse. It is worked by a lever on the right hand side. Speeds of 12, 7 and 3 miles an hour are the standard. A universal joint rod drive to the back axle is employed. Two separate brakes are fitted on the car, one of these being a hand brake worked by a lever placed next the speed changing lever, and operating directly on the wheels. A pedal brake is also thrown on the differential. The front wheels have solid rubber tires and the back wheels iron-protected rubber. The wheel gauge in front is 1.674 meters and in the rear 1.577. The wheel base is 2.80 meters, which allows of turning in a width of 40 feet. The total weight of the car under full load is 7 tons.

A 750-gallon tank is mounted on the truck for the water supply, and a turbine pump which can be coupled to the motor by a clutch serves to feed the water to two spray nozzles of the Plainchamp type mounted in the rear of the car. The standard water feed is 50 gallons per minute upon a maximum width of 46 feet. The driver can easily regulate the water spray without leaving his seat, and can reduce or shut off both sprays or only one of them in order to avoid wetting vehicles or pedestrians.



Second type of French municipal motor wagon—water spray in back, and sweeper.

The fuel consumption is quite low, and it is for this reason that power wagons of the same kind were awarded a prize by the war department. In usual running the average per 100 kilometers (60 miles) is 10 gallons of gasoline, two-fifths of a gallon of lubricating oil and 1.5 pounds of grease.

Of a somewhat light build is the second class of machine, which combines a water spray resembling the above and a revolving sweeper brush. One of these has been lately put in use by the city of Paris and it is found to work very well. The present type was adopted after

Motor sprinkler used in Santander, Spain.

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considerable discussion of the question between the builder and the city engineer. A 20-horsepower 4-cylinder motor is used here, of 3.6 inch bore and 4.8 inch stroke, and it is lodged under the front box, while a covering case runs below the truck and clear to the back so as to protect the working parts from dust. The mechanical parts of the chassis are about the same as the above. Solid rubber tires are fitted on all four wheels. The wheel gauge is 1.7 meters in front and back, and the wheelbase 2.91 meters, which allows the car to turn in a width of 33 feet. The total weight of the car under full load is 3 tons. A smaller tank than the preceding, of 600 gallons' capacity, is used here, with a similar spray at the back of the car; but in the present case the width of road covered by the spray is larger, this being 20 feet, with a feed of 150 gallons water per minute. Under the chassis is a sweeper brush mounted obliquely and running in the contrary direction from the vehicle drive so as to drive the mud to the side. This gives a sweeping width of about 2 meters. A small pump sends a fine water spray in front of the brush so as to wet the dust beforehand. A hand lever allows the driver to raise or lower the brush, and by regulating this part the brush can be used until it is much worn down. The fuel consumption of this car, which works ordinarily at the second speed or about 5½ miles an hour, is the same as the other. When empty, it can be run at third speed or 9 miles an hour, and it can also be used at this speed for a rapid watering, with the brush drawn up.

In the third class of car there is no water spray used at the back, but a 250 gallon tank is mounted on the

Taking on water—a street scene in Deauville, France.

truck so as to give a fine spray just before the sweeper brush as in the car just mentioned. The town of Versailles is now using a sweeper of this kind. In this as well as the foregoing chassis, the side bars are of pressed steel, but in the present truck a 14-horsepower 4-cylinder motor is used, of 3 inch bore and 4.8 inch stroke. The standard speeds are 9, 6 and 3 miles an hour.

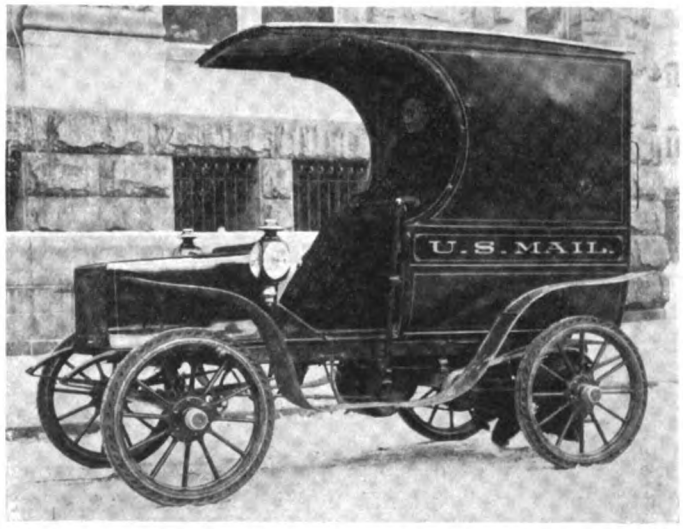
A motor wagon operated by natural gas was recently demonstrated in Pittsburgh.

Motor sprinkler using one spray only, in passing a vehicle—a street scene in Santander, Spain.

ELECTRIC MAIL WAGON.

The Rauch & Lang Company, through its Washington, D. C., agent, has recently succeeded in closing a contract with the Postmaster General to place in service a model 30, double chain drive, electric wagon. It is to be tried by the Post Office as an experiment for collecting mail, with the idea of adopting this type of car throughout the country, if practical for the service. It has been equipped with a specially built body of very light design. The machine is operating 16 hours a day with a mileage varying between 95 to 105 miles. A change of batteries is made three times a day. Exide batteries are being used. The tire equipment is the Motz high efficiency electric, 32 by 3½ inches. So far the electric has proven very efficient for this service, it being particularly adapted for the service required of making 60 to 80 stops on a trip. The results are being carefully watched by the Post Office officials. The accompanying illustration shows the machine now in use.

Two motor wagons are in regular freight service between Bend and Burns, Ore., a distance of 142 miles.



Electric mail wagon used in Washington.

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Solid Rubber Tires.

An Unusually Lucid Exposition on the Use and Abuse of Tire Equipment.

By S. V. NORTON, Goodrich Rubber Co.*

WHAT IS meant by the overloading of rubber tires? In the process of manufacture, crude gum is mixed with pigments and the whole mass is kneaded together until the compound becomes homogeneous. After various intermediate steps, the rubber is placed in a mold and vulcanized. During vulcanization the tire assumes a more or less permanent form, to which it will normally return if it is not stretched or compressed beyond certain definite limits. If the stretching or compression exceeds these limits, however, the strain will invariably cause a rupture or disintegration of the rubber.

To illustrate: Take a strong, properly vulcanized rubber band. Stretch it moderately, release it, and it will return to its normal shape. The process may be repeated indefinitely, and the band will resume its shape. Stretch it beyond its limit of elongation, however, and the rubber breaks, and you can't restore it to its previous condition. The damage has been done, the rupture is permanent. Similarly, a piece of rubber properly vulcanized may be compressed within certain limits; released, and it will resume its normal shape. The compression may be repeated an indefinite number of times, depending upon the quality of the compound. So long as its limit of compression has not been reached, the rubber will continue to spring back into shape and nothing but abrasion or some other physical or chemical action will destroy its elasticity. Compress it beyond its limit of cohesion, however, or, in other words, beyond its power of resistance, and the rubber breaks down or ruptures just as inevitably as in the case of stretching beyond its limit of elongation. The rupture is absolute and permanent. No method yet devised will restore to the unit its former elastic qualities. The damage is done, and disintegration has commenced—not because the average load exceeded the limit of resistance, but because some one load exceeded it, and started the rupture. If I can impress upon you the great danger of ruining solid tires from once overloading them I shall feel gratified.

Tire manufacturers have adopted a schedule of carrying capacities which, with but slight variations, is now considered standard. The factor of safety in the schedule is nil. So many other factors enter into the matter, such as excessive strains due to bumps, depressions in the roadway, negotiating grades, overspeeding, and the severe use of brakes, that no provision has been made for overload.

* * *

Insufficient Tire Equipment.

There are three kinds of overloading. The first is due to undersized original tires. I fully realize that the competition in your business makes it necessary for you to economize wherever possible in the equipment of your trucks. You build the best machines that money and skill can devise, and you offer them for sale fully guaranteed—except for tires. Without knowing the danger you are running you may perhaps equip them with the smallest tires that will come within your schedule of carrying capacities. Then, if the tires fail to deliver the service expected, the responsibility is at once automatically shifted to our shoulders, and we are expected to live up to our reputations for liberally taking care of our product. Suppose your sales agents order just the chassis and then have special bodies built—bodies too heavy in themselves, or so large as to permit the carrying of loads far in excess of those the tires are able to sustain without breaking down. What happens? Your customers soon have trouble with their tires, and they complain that the cost of maintenance is more than they had been led to believe.

* * *

Disproportioned Tire Equipment.

The second kind of overloading is due to disproportioned equipment. Sometimes we find that trucks whose tire equipment, regarded as a whole, is ample for the service required, will be lacking in carrying capacity at one end, while at the other end there may be an excess capacity over the actual demands. I have in mind a case in which the proportion of weight carried by each axle showed that the front tires were considerably overloaded, while those on the rear had an excess capacity of nearly a ton. The owner of the truck protested his innocence, saying that he had never been told he was misusing his tires. The proper sized front tires applied, there was no further trouble.

* * *

Improper Loading of Machine.

The third kind, which is at once the most prevalent, the most illusive, and the hardest to cope with, is due to the improper loading of the truck. Sometimes this may be the result of faulty distribution of the load over the front and rear axles, which may cause the failure of the tires wholly without the knowledge of the owner. This is well illustrated in the case of a wholesale grocer whose custom it was to put all light packages on the front of the truck and save the heavy ones for the rear, with barrels of pork, molasses, sugar and kerosene on the tailboard.

In a coal concern the loose load was distributed in the truck body, and then the rear was piled up with bags of coal. In each of these cases the total load was within the combined capacity of the tire equipment, but not properly distributed.

* * *

Abuses In Demonstration.

The most difficult phase for the tire maker to over-

*A paper read before the National Association of Automobile Manufacturers at the New York convention, March 4-5, 1912.

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come, however, is the deliberate placing on the truck as a whole too heavy loads for the tires to carry. The way is paved for the abuse even before your prospect has bought a truck. I refer to the temptation to which some of your salesmen yield to carry heavier and bigger loads than they should, when they give demonstrations before a prospective purchaser. When it becomes known that a man is thinking of buying trucks he is besieged by agents asking the privilege of giving demonstrations. A fierce competition then ensues to win the order, by showing how much merchandise may be moved within a given period, and how fast it can be carried. The result is that some of the loads carried in these competitions vary from 50 per cent to 100 per cent over the rated capacity of the tires.

The drawing of trailers is another means of improperly loading tires. No doubt this is an economical means of hauling, but trucks so engaged are placing a greater strain upon their tires, and they should be at least the next size larger than those which would safely carry the truck without a trailer.

* * *

Dangers of Overspeeding.

Turning now to the efforts of overspeeding on solid tires, I ask you to consider three things. They seem so axiomatic that they need only be mentioned briefly. First, overspeeding generates excessive heat in the tires, which tends to shorten the life of the rubber. Even though not overloaded, they may be driven so fast that they are burnt up, as it were, in a very short time. Second, it accentuates shocks and jars due to unevenness in the roadway. The stresses thus set up are really the equivalent of sudden overloads, and they tend just as effectively to cause the premature failure of the tires as though they were loaded beyond their capacity. Third, it induces the severe use of brakes, especially in thoroughfares in which there is much traffic. This in turn is apt to cause unnecessary friction with the road surface, which, of course, wears out the tires promptly.

* * *

Consumer Pays for Tire Abuses.

Let us next consider who pays for these abuses. In guaranteeing the truck exclusive of the tires, the truck manufacturer conveniently arranges to "step out from under." The burden therefore seems to fall upon the truck owner or the tire maker, although I say frankly that the ultimate consumer bears most of the load. When tires fail prematurely the truck owner looks to us for an adjustment. Generally our salesmen have an accurate knowledge of the conditions under which such tires are operated, and if they have been overloaded we have taken occasion to warn the operator that we cannot be held responsible for failure to deliver normal mileage. Many users seem to feel that because their average loads do not exceed the rated carrying capacities of their tires they have not overloaded them, and consequently the rubber manufacturer should furnish other tires, free, to run out the guaranteed mileage. As there is no gauge by which the loads carried can be recorded, the tire maker has to accept the statement of the truck owner, or run the risk of an unpleasant controversy if he questions it. The truck is laid up—or perhaps merely the tire, if it is of the demountable type—and an adjustment or a rapid renewal is made, prematurely. Either method of settlement is more costly than continued service under proper conditions. The truck owner complains that the cost of maintenance is higher than it had been represented to him, although the chances are he had not been impressed with the high cost of overloading.

* * *

The Tire Maker's Viewpoint.

You will admit that it is not sound business for a manufacturer to replace an article without due charge, if the user of the commodity has wittingly or unwittingly destroyed it. In self-protection, therefore, as well as for the education of the user, we stand our ground, and sometimes we have controversies through which we pay our share. We write letters, we send telegrams, we make personal calls and we send tires by express—all of which are expensive, and might have been avoided. Occasionally these contentions result in the loss of the customer, who decides to use another make of tire. In such cases, we feel that we have merely transferred an undesirable account to a competitor, who takes up the burden. Sometimes, however, for the sake of future business under saner conditions, we pay our part of the bill at once as a matter of policy. We make concessions which curtail the profit from the sale of the new tire, but as most users realize the advantage of renewing with a larger-sized tire, the business relations from that time on are upon a much more satisfactory basis.

But you truck makers also pay, indirectly, because you sell fewer trucks than you might, were it not for the unnecessarily high cost of maintenance which these abuses entail. I venture to say that at this moment your sales departments are all spending time and money trying to overcome the honest conviction on the part of several prospective purchasers that the chief reason for their not buying trucks immediately is, not their unwillingness to make the original investment, but their fear that the cost of upkeep will more than offset the saving to be gained through the use of your trucks. And the chances are that their principal concern is over the cost of tires. This idea has gained undue prevalence because of the unfortunate experience of many operators who have been obliged to pay for destroying their own tires by overloading and overspeeding them, whereas, if they had used tires large enough to perform their work economically, they would be enthusiastic advocates of motor delivery.

A bill introduced into the Ohio legislature at the suggestion of Mayor Helmbold of Cincinnati provides that motor wagons may be licensed by cities regardless of the state auto license law.

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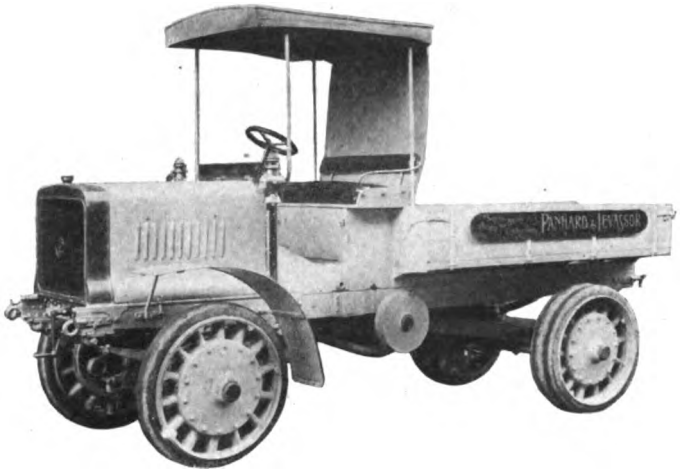
Four-Wheel Drive.

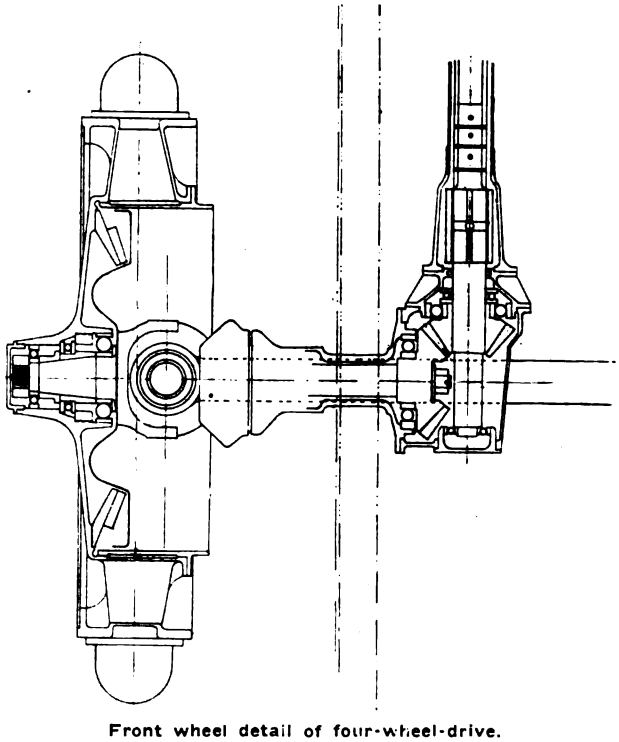
Description of a New Machine Designed by a Leading French Manufacturer.



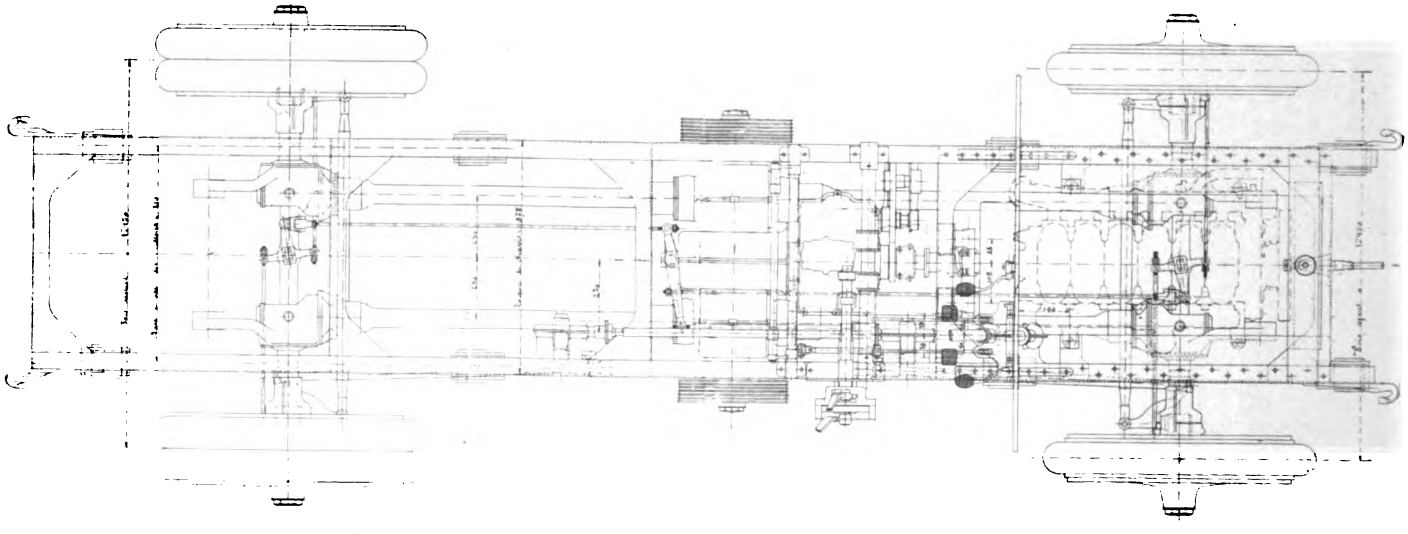
New four-wheel-drive motor wagon of French design.

SOMEWHAT of a novelty in the way of power design is the new Panhard-Levassor machine which is operated on the Salvator patented principle. All four wheels are made to act as driving and steering wheels in this case, so that heavy loads can be taken upon steep roads and on sharp curves to better advantage, seeing that all the weight now serves for adherence. The steering is carried out so that the wheels on the same side of the wagon have an equal angle and the rear wheels run in the same tracks as the front wheels. Seeing that the distances covered by the wheels on the same side are equal, it was possible to design a single differential which takes care of the right and left pair of wheels and gives the needed variation in speed for running in curve.

From the motor, the shaft runs to a speed gear box near the middle of the chassis. Assembled with this box is the differential which operates the four motor wagon wheels. The differential is in two parts lying on each side of the gear box, and from each part a shaft runs to the front and rear wheels on that side, making four rods which run parallel to the truck axis. Each rod is brought to a point on the wagon axle lying next to one of the wheels, and the rod operates the wheel by a suitable driving mechanism. This latter consists of a crown bevel gear running around the inside of the car wheel, and this is driven by bevel pinion and other gears and shafting which connect with the end of the differential rod. In this way each of the four wheels is driven by its rod and the whole four rods center at the middle of the truck as already indicated. The new motor wagon carries a 6-cylinder, 33 to 45 horsepower motor, and the total weight is 6½ tons. It was able to mount a grade of 4 per 100 at full speed or 10 miles an hour, and an 8 per 100 grade at third speed or 8 miles an hour, and



Front wheel detail of four-wheel-drive.



Plan of chassis of Panhard & Levassor four-wheel-drive motor wagon.

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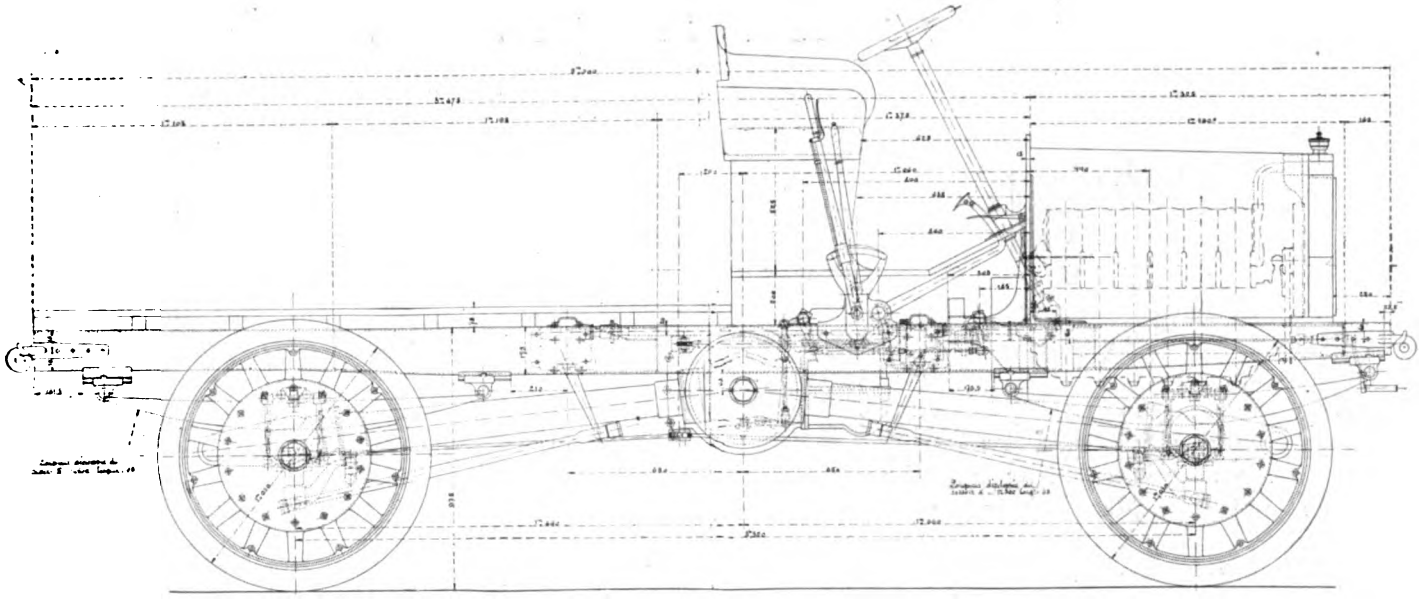


Side elevation of chassis of Panhard & Levassor four-wheel-drive motor wagon.

various other trials showed a good performance. Towing a load of 11 tons (two 5½-ton cars) it mounted a 9 per 100 grade at the slow speed of 2 miles an hour, and a 4¼ per 100 grade at a mean speed of 4 miles an hour, this latter upon a half-mile stretch of road.

LOW SPEED SPELLS SUCCESS FOR ELECTRIC.

"We all know that for city and moderate hauls the electric vehicle has arrived, due solely to its reliability and low maintenance," said Alexander Churchward in a recent paper before the Electric Vehicle Association of America. "And the one reason for this is the moderate speed at which it operates. If the gas car manufacturers awake to the fact that high speed means high cost of maintenance, then there will be some competition in the short-haul field.

"The effect of high speed on motor wagons fitted with solid tires is well shown by curves plotted from tests made by Michelin.

"At the summer meeting of the S. A. E. a short paper was read on the energy consumption of vehicles and gave a table of speeds for various weights of cars as follows:

Gross weight.	Tires.	Miles per hour.	Gross weight.	Tires.	Miles per hour.
1,500	Pneumatic	20	4,000	Solid	13
2,000	Pneumatic	20	5,000	Solid	11
3,000	Pneumatic	18	7,000	Solid	9
4,000	Pneumatic	16	10,000	Solid	8
2,000	Solid	16	15,000	Solid	7
3,000	Solid	15	20,000	Solid	6

"Within the last month I have again taken this matter up with a number of manufacturers and a compilation of their speeds is given below:

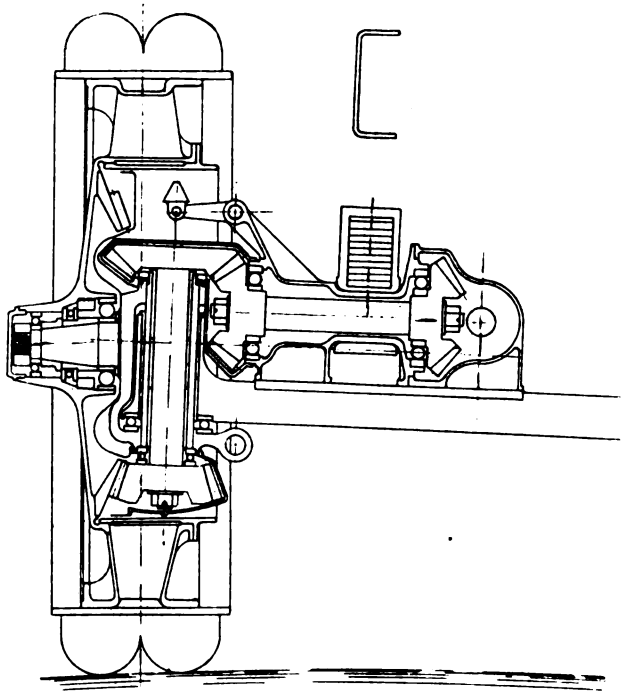
Carrying capacity.	Speed, miles per hour.	Carrying capacity.	Speed, miles per hour.
1,000 pounds	12-13	3 tons	7-8
2,000 pounds	10-11	4 tons	6.5-7.5
3,000 pounds	10	5 tons	6-7
2 tons	8-9	6 tons	6.5

"A 3 ton power wagon to compete successfully with horses does not have to run at touring-car speeds. The average speed of a 3 ton horse-drawn truck will be about 2.5 miles per hour, and the mileage not over 12 to 15 miles per day. Therefore a 3 ton motor wagon running at 7.5 miles per hour will compete very successfully with the horse-drawn vehicle, and its maintenance will be low.

"The maximum speeds must be kept down in order that the electric vehicle will continue to hold the enviable position it does to-day, viz., that for city work and short hauls it is the cheapest and most reliable method of mechanical traction."

A motor bus line is proposed by a Chicago promotor for service in Laporte, Ind., and to connect that town with Chicago. Five motor buses, of 20 to 25 seating capacity, will be used.

Motor mail wagons have been installed for the services out of Lubbock, Texas.



Rear wheel detail of Panhard & Levassor four-wheel-drive motor wagon.

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Motor Coal Transportation.

A Timely Article Which Gives All Sides of a Peculiar Problem.

By WILLIAM P. KENNEDY.*

IN ATTEMPTING to supersede horse equipment by motor wagons in the transportation of coal the vital question is whether the conditions of operation can be so modified as to permit of applying the machine to such an amount of its capacity as will reduce the present cost with horses. There is no question but that, if conditions are arranged so that the machine can be permitted to operate for a sufficient period of the working day, it will readily effect a saving.

There are at present many impediments to such machine employment, due largely to delays incident to making the delivery as well as the delays quite frequently experienced in loading at the coal yard. Unloading conditions present the greatest difficulties because they are usually beyond the control of the operators, but the yard conditions being absolutely in the hands of the coal operators, there should be no reason why the loading of coal cannot be accomplished with very short delay to the machine.

Another important consideration is that unless the loading and unloading of the coal is performed by mechanical means it is difficult to show a saving, unless the distance over which the coal is transported is sufficient to make the speed of the truck effective as a saving. The dependence upon any hand method of loading and unloading is prohibitive.

Another impediment is the fact that the transportation of coal is a seasonable performance and the long months of inactivity, as well as the difference in volume of business between the mid-winter conditions and the seasons of lesser activity at the beginning and end of this season, make it somewhat difficult to decide upon an equipment which will be large enough to take care of the maximum conditions and yet will not involve too much investment for the average or normal conditions, and further, the possibility of selecting an equipment of such character as to permit of its use in other lines of service when not required for coal transportation.

That the difficulties with regard to loading operations can be changed to provide for quick loading by mechanical means is quite apparent from the number of coal yards which are equipped with hoppers and other mechanical devices which provide for quick loading of the coal. But where such apparatus is not in existence, the coal dealer has not only the consideration of purchasing an expensive equipment of automobiles, but frequently in addition an expensive modification of his yard facilities.

It goes without saying that the ideal way to load motor trucks would be automatically from the hopper system, the machine passing under the hopper and taking its load in a very few minutes and immediately starting upon the delivery. If this hopper equipment is not in existence the most inexpensive solution of the matter of lessening the delay in loading would be to employ extra bodies, which might be loaded in the absence of the machine and which could be quickly mounted or demounted by the power equipment of the machine itself. This plan might avoid the necessity of any serious change in yard equipment and the cost of loading by hand would not be a serious consideration when contrasted with the investment necessary for mechanical loading. Several plans have been already employed by which separate or spare bodies are utilized in this manner, the body in some cases being hoisted vertically off the truck and held in a suspended position while being loaded until replaced on the machine again for delivery.

* * *

In making deliveries of coal, such a variety of conditions are encountered as to make it often difficult to determine whether the automobile body should be stationary with end or side inclined chutes, whether it should be a body capable of being lifted vertically, or whether it should be tilted at one end or possibly tilted and the body dumped to the ground as is occasionally necessary in handling soft coals.

All these types of body equipments on machines are in use, as well as the scheme of handling a large quantity of coal on the semi-trailer equipment, which has the advantage of transporting the greatest portion of the weight over ordinary large diameter wheels with steel tires, but the final determination as to what class of body will be selected must be determined by the particular operating conditions for which the machine is intended.

* * *

It is certain that larger loads of coal can be transported by machines than by horses, and in very much less time, but sometimes the delivery conditions of the operator prevent him from utilizing the larger sizes of machines in view of the fact that his deliveries are to be made in smaller quantities. Such a case as this is coped with by the employment of a large machine with several compartments in the body so that any one of two or three portions of the load may be discharged without interfering with the balance.

* * *

The problem, therefore, is not whether coal can be transported more cheaply by machines than horses, but whether the existing conditions in any particular case will permit of the employment of the machine to anything like its economic capacity. Sometimes these conditions are unchangeable, and again slight modifications

*A paper read before the Retail Coal Dealers' Association of New England, March 14, 1912.

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or changes only are necessary in bringing about new conditions which permit the machine's utility to be taken advantage of.

In many cities coal has to be delivered in the most inaccessible places; sometimes to very small manholes at the edge of the sidewalk, sometimes through openings which are located at the building rather than at the edge of the sidewalk, and in other instances into openings which are in the walls of the building above the sidewalk. It seldom happens, except in industrial institutions, that the coal can be directly unloaded below the place on which the machine stands. Wherever these conditions can be changed so that an inclined inlet or chute can be provided from the machine to the coal pile, the quick discharge of the coal from the machine can be accomplished; but this is frequently impossible, and in some cases a form of chain bucket conveyor has been fitted to the machine so that the load may be transferred in this manner to points which are otherwise inaccessible.

* * *

In the matter of securing from coal operators reliable information on the cost of transportation with horse equipment there appears to be considerable difficulty, due principally to the variety of bookkeeping methods, wherever they exist, and the lack of any uniformity in cost per ton or other unit delivered is due to consideration which must be given to the complete inactivity of the equipment during a portion of the year and the variance of activity from one end of the busy season to the other.

Some installations require the maintenance of the horse equipment during the entire year, due to the difficulty found in the selling and replacement, but quite frequently the expense of this all year maintenance is reduced by pasturing the horses in the inactive period. In other cases the horse equipment may be hired out, but in few cases is there any provision for the employment of the vehicle equipment during its inactivity.

The only safe and general way by which the cost per ton can be arrived at is by taking the entire year's cost of operation and upkeep and charging this to the total tonnage transported per annum, but we frequently find that only the current charges for the daily operation of the horse vehicles when in active service are charged against the transportation for the current day, and with these data alone is the machine operation compared. Again, we find the reverse condition, as where an installation may be active twenty-six weeks of the year, while the total cost of the year in bulk is divided by 300 to arrive at the cost per day and this cost per day used as the basis of determining the cost per ton delivered for any day of the 26 weeks. As a matter of fact, the annual cost in this instance should have been divided by 150 to determine the cost chargeable to each active day, and on this basis the cost per ton would be twice that of the former.

* * *

The whole problem requires segregation of those charges which are constant whether the vehicle is employed or not, and an additional charge for those items affected by activity added to the first or fixed charge so as to arrive at a true cost of unit performance, whether this latter be based on a tonnage rating or on a ton mile basis.

It is quite possible in determining the operating cost of machines to follow a similar practice of separating the inactive or constant charges from the active charges and the total charge per day thus arrived at should be used in the determination of the cost of delivery per ton or per ton mile.

* * *

To exemplify this the attached table may serve to show the charges influenced by service or inactivity. The items marked "variable," however, are dependent upon each operator's particular condition, and to cover charges for garaging and for operators we have assumed a figure of $60 per month for garage and $20 per week for labor. This table with the total figures shown is intended to cover a year's operation and a performance of 50 miles per day per vehicle.

In this table it will be observed that on each size truck there is a figure for fixed charges, which includes interest at 6 per cent, and a depreciation of 10 per cent, on those parts of the vehicle which are not subject to wear and which are replaced or renewed under the heading of maintenance. Under the maintenance charge there is a figure for the upkeep of mechanical wearing parts and another for tires, and in the operation division there are figures covering consumption of gasoline and lubricating oil, operators and other incidentals to the cost of service.

* * *

Assume that we are to determine the cost of operation of a 5 ton truck which is employed the entire year. The items for fixed charges, garaging and operators are constant and independent of the tonnage or mileage performance of the vehicle. This charge against the vehicle while inactive will amount to $7.56 per day, assuming 312 working days to the year, and the total of the maintenance items, together with the items for fuel and lubrication, can be resolved into a cost of 11 cents per mile, since this example is intended to cover a 50 mile performance each day for 312 days.

Now, with the inactive charge of $7.56 per day and the charge of 11 cents per mile, by multiplying the latter by the mileage performance of the truck on any particular day and adding it to the inactive charge of $7.56 per day we get the total cost for transporting the day's tonnage and in this manner arrive at the actual cost per ton.

Assume that the truck covers 33 miles and delivers 31 tons. Thirty-three multiplied by 11 cents per mile equals $3.63, the active charge, and this added to $7.56, the inactive charge, makes the total cost of the day's performance $11.19, and since this day's performance is the delivery of 31 tons, we divide this figure by 31

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and find that the cost per ton is 36 cents. In a similar manner any other performance can be calculated.

* * *

In the event of the machine being used only half of the year the fixed charge of $7.56 would be reduced by 50 per cent of the annual charge for operator and a reduction of the garaging charge during six months to say $5 per month, thus making the fixed charge for the days the machine is rendering service $4.93 instead of $7.56, and consequently reducing the cost per ton in the particular case cited to 27 cents instead of 36 cents.

If for comparison against such machine cost we have a definitely known cost of transportation per ton with horses, it is quite possible to determine the performance limits of the mileage and tonnage which the machine must accomplish to equal or better the horse cost.

Independent of the higher charges for interest and depreciation which must be made against the machine equipment, it must be recognized that whenever this machine equipment is not being used all the other charges against it cease, with the possible exception of storage, while this is not the case with the horse equipment, which must be fed and cared for almost independent of the service rendered, so that if the machine equipment were not used for six months of the year there might be a considerable reduction in expense over that required to maintain the horse equipment during the same period.

Finally, it should be borne in mind that if there is a long period where the machine is not required for coal transportation and the operator maintains his own garage, it will be quite possible to rent such an equipment at profitable figures in other lines of service, and while assuming control of the garaging and maintenance of the vehicles the owner takes little risk or hazard in leasing the vehicles for such extra service.

It can be readily assumed that such service can be leased at a profit and if this profit is credited against the winter performance cost of the equipment in delivering coal the inactive months of the coal business may thus be made a benefit rather than a detriment to transportation cost by the employment of a motor wagon equipment.

GENERAL AVERAGE OPERATING COSTS—ANNUAL.

Machine Size.	2-ton.	3½-ton.	5-ton.	6½-ton.
FIXED CHARGES—				
Interest on investment @ 6% and depreciation on wearing parts @ 10%	$376.00	$458.00	$600.00	$709.00
MAINTENANCE—				
Wearing parts	346.00	420.00	487.00	495.00
Tires	358.00	519.00	757.00	886.00
GARAGING—				
Storage and washing (variable)	(Assumed)			
Garage labor (variable)	720.00	720.00	720.00	720.00
Insurance (variable)				
OPERATION—				
Gasoline @ 10c per gal.	250.00	300.00	375.00	500.00
Lubricating oil @ 35 cts. per gal.	39.00	75.00	105.00	119.00
Operator (variable)	(Assumed)			
Helper (variable)	1,040.00	1,040.00	1,040.00	1,040.00
Licenses (variable)				
	$3,129.00	$3,532.00	$4,084.00	$4,469.00

Based on performance of 50 miles per day per truck, 312 working days per year.

Total fixed charges, garaging and operator, 5-ton truck	$2,360.00
Total fixed charges, garaging and operator, 5-ton truck, per day	7.56
Total charges for maintenance, gasoline and oil, 5-ton truck	1,724.00
Total charges for maintenance, gasoline and oil, 5-ton truck, per day	5.525
Total charges for maintenance, gasoline and oil, 5-ton truck, per mile	.11

ADDRESS BY P. D. WAGONER.

"I think it must be conceded that when hundreds of the largest firms in the country officially adopt the electric motor wagon for their city delivery service they must consider it perfected at least to the extent of being superior to horses and more economical than non-electric trucks for this work," said P. D. Wagoner, president of the General Vehicle Company, to about one hundred members and friends of the Boston Electric Vehicle Club at a banquet at the Hotel Thorndike on the evening of March 11 in celebration of the first anniversary of the starting of the electric vehicle development campaign in Boston.

"When I tell you that 100 firms already use 1,009 electric trucks of one make, that two express companies have purchased no less than 356, three brewers 172, three packers 119, three delivery contractors 93 and three central stations no less than 158, and when you further consider that in case of the express companies, the brewers and the central stations many of the electrics now operated by them have been in service from 6 to 11 years, you must admit that such extensive buying not only voices confidence in the electric but demonstrates as well that the electric truck gives a larger return on the investment than other types of power wagons.

"This is certainly true of city work and the bulk of heavy trucking and deliveries in the city. The fact that in changing from horses to electric trucks you can utilize your regular horse drivers does much to simplify the operating and economic problem of the man who is adopting motor vehicles. Many of the horse drivers possess a valuable knowledge of the firm's routes and methods of delivery.

"I am not exaggerating when I say that with about 48 hours' instruction by a competent demonstrator the average teamster can be taught to successfully operate a 5 ton electric truck. That is, he will be able to take it around corners without taking the lamp-post with him, back it into alleys or doorways, go down grades at a safe pace, etc. Furthermore most drivers are not only willing but anxious to drive the electric.

"Automobiles for pleasure and commercial purposes are going to be used regardless of economy of operation. Automobiles are in the air, the atmosphere is charged with the automobile idea. Automobiles are in line with the restlessness, the progress and the spirit of the age.

"The motor truck is a money-saving proposition, yet the world is going to have it because it is up to date, a part of modern business. Electricity provides the solution of most of the transportation problems of our cities and towns. The people like electricity. It is a good, clean product. I bow to that great, silent force."

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Motor Bus Notes.

Extraordinary Activity in the Use of Motor Buses All Over the Country.

Chicago, Ill.—The Chicago Motor Transfer Company, which already operates a fleet of 16 motor buses, 12 gasoline and 4 electric, has established another motor bus route. Beginning March 15, a gasoline bus runs on a regular schedule between the Northwestern depot and the corner of South State street and Jackson boulevard, making 16 round trips daily. The fare each way is 5 cents.

* * *

Miama, Ariz.—Ralph Sturgis has established a motor bus line between Globe and Miama. Three machines are in use.

* * *

Duluth, Minn.—A. H. Kuehnow and associates have installed two electric motor buses to ply between West Duluth and New Duluth. The round trip fare is 25 cents, which, added to the street car fare, makes the round trip to the steel works only 35 cents as against 60 cents charged by the steam railroad.

* * *

Spokane, Wash.—The Hotel Pedicord, of this city, has installed a 12 passenger gasoline motor bus.

* * *

Denver, Colo.—Two 20 passenger motor buses are now in operation between this city and Brighton, a distance of 19 miles. Each machine will make two trips a day.

* * *

Fort Dodge, Ia.—R. W. Crawford states that $17,000 of a needed $25,000 has already been raised to establish a motor bus line in Fort Dodge. A company will be incorporated under the laws of Iowa in the near future.

* * *

St. Paul, Minn.—G. A. Perry, secretary of the Twin City Motor Transit Company, has placed a contract for 12 motor buses which will be used in a 30-minute passenger service between Minneapolis and St. Paul hotels. The first machines will be placed in operation in April.

* * *

Cincinnati, Ohio.—The Cincinnati Advertisers' Sightseeing Automobile Company, with a capital of $10,000, was chartered at Columbus on March 7 by W. E. Kreidler and others. A "rubberneck" motor bus will be installed for the benefit of tourists.

* * *

San Rafael, Cal.—A proposal to establish a motor bus system, making trips on schedule time, between San Rafael and points in Rose Valley—San Anselma, Ross, Kentfield, Corte Madera—and even to Mill Valley and Sausalito, has been made to the business men of San Rafael and the Board of Town Trustees. The plan as propounded to the trustees is either that the city purchase and operate the line following its establishment, or that it subsidize the system, guaranteeing a sufficient income. At present the various towns mentioned, though all adjacent, have no system of communication except that afforded by the Northwestern Pacific Railroad Company's third rail system, trains over which during the major part of the time are operated only at hourly intervals.

* * *

Pottsville, Pa.—Incensed because of the announcement of the Eastern Pennsylvania Railway Company that the rate of fare between Pottsville and Schuylkill Haven would be increased, residents of these towns are now contracting for the services of motor buses to ply between Pottsville, Schuylkill Haven, Palo Alto, Port Carbon and St. Clair. It is believed these machines can make good time over the new state road and that they will become very popular. The vehicles will cost $4,000 each.

* * *

Minneapolis, Minn.—Motor bus service to Anoka will be resumed by the Girling-Warner Company April 1, weather permitting. Three machines will be in service and each will make two trips, making six round trips a day. One will be run to St. Michaels and Lake Charlotte, making a round trip of 86 miles. The company will this year install a motor bus service between Chisholm and Mountain Iron on the range. The "pay-as-you-enter" type of car is being built and will be shipped to the range. Should this type prove successful it probably will be installed in Minneapolis, according to Thomas Girling, president of the company.

* * *

Buffalo, N. Y.—W. G. Wilson, who hitherto has operated a horse bus service between Ridgeway and Crystal Beach, will supersede his present equipment by motor buses running on a regular schedule when the new season opens.

* * *

St. Louis, Mo.—Park Commissioner Davis has presented to the Board of Public Improvements a bill authorizing the establishment of a motor bus line, starting at the various entrances to Forest Park and carrying passengers to Art Hill for a nominal fare. The Commissioner thinks his plan would make the paintings in the Art Museum more accessible to thousands of persons who do not visit the gallery because of the long walk. If the Board of Public Improvements approves Davis' bill, it will be presented to the Municipal Assembly.

* * *

Prophetstown, Ill.—A motor bus line has been installed between this city and Morrison, making all train connections at Lyndon.

* * *

Washington, D. C.—The National Motor Transportation Company has been incorporated to install electric motor buses between the more important resi-

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dence neighborhoods and the principal downtown centers. Under an order given some time ago it is expected delivery will be made soon of a sufficient number of "pay-as-you-enter" front vestibule buses to permit a schedule of unbroken, frequent service from 7 o'clock in the morning until midnight, with a headway of less than five minutes during the rush hours in the parts of the city where congestion of traffic is greatest. The routes announced to be covered are as follows: One line via Sixteenth street and Pennsylvania avenue to the Center Market, returning via F street and Sixteenth street; another line via Massachusetts avenue and F street to the Union station and Capitol and return, with the possibility of further extensions to other parts of the city and the park system as soon as conditions seem to warrant. These routes will bring the buses of the company past most of the important public buildings, hotels, theaters, stores, banks and office buildings, as well as the Union station and the Capitol. In the announcement it is declared the first board of directors will include E. E. Jordan, Horace H. Westcott, S. E. Lyon, Judge Ashley M. Gould, Mandeville Carlisle, Samuel Ross and Edward H. Wales.

* * *

Chicago, Ill.—Evanston, a suburb of Chicago, is planning to supersede its street railway system by motor buses when the franchise of the Union Traction Company expires in February, 1913. Alderman Charles Wallace, chairman of the railroad committee in the council, favors the innovation.

* * *

Clifton, Ariz.—A motor bus line will shortly be established between this place and Morenci.

* * *

Cheyenne, Wis.—Albert Bayers will install motor bus service in the spring between Rawlins and Lander and between Lander and Pinedale and South Pass.

* * *

Reading, Pa.—A new 16-passenger motor bus has been put in service by the Union Transfer Company to run from the hotels to the depots.

* * *

Springfield, Mo.—Two or three motor buses will probably soon be installed to run on regular schedule between the public square and Phelps Grove in the interest of real estate men who wish to develop Phelps Grove as a residential section.

* * *

San Diego, Cal.—A $7,000, 50-passenger, double-decked motor bus has been installed to convey guests of the Grant Hotel from and to the Santa Fe depot.

* * *

Freeport, Ill.—A motor bus line will be established to operate between the end of the Stephenson street car line and the golf links.

* * *

Vacaville, Cal.—A cut rate war is now being carried on by rival motor bus lines between Vacaville and Elmira. The fare at present is half of what the two lines charged a few days ago. The fare was first cut by the motor bus line conducted by the Vacaville Livery and Feed Company, and if necessary the fare will be made still lower in order to put a competitor, E. H. Ream, a grocer, out of the motor bus business.

* * *

Detroit, Mich.—Six buses are already built, ready for use by a company which was recently organized to operate motor buses in the Woodward avenue district. The buses have a seating capacity for 20 passengers and a 3 minute service will be established south of the boulevard.

* * *

Sault Ste. Marie, Mich.—R. J. Wynn, of the Standard Auto Company, is figuring on establishing a motor bus line during the summer months, in connection with the Arnold Transportation Company, between the Soo and Hessel.

* * *

Toronto, Can.—E. A. James, town engineer of North Toronto, is considering a proposition to establish motor bus service to parallel the street car system.

BAVARIAN MOTOR BUSES PAY 9 PER CENT.

Bavaria has 86 motor buses, mostly of the char-à-bancs type, which are earning a net profit yearly of $64,395, or over 9 per cent on an invested capital of $705,230.

There are 37 permanent services and 15 others which are worked only during the tourist season.

In addition to the 86 motor buses the company operates 33 trailers for passenger service, 11 motor trucks for freight delivery, and 24 freight trailers, including two sleighs.

During the past year 1,389,298 passengers were carried, besides a large amount of merchandise. The total vehicle mileage was 1,319,000 miles.

The company employs 116 drivers, 24 laborers and brakesmen, and 28 workshop foremen.

The average fare is about 2 cents a mile, but the rates are increased in summer, express service during the warm months being charged for at the rate of about 6 cents a mile.

Since the horse drawn omnibuses have been superseded by motor buses the traffic has increased by 11,200 per cent. A further expansion of the service is contemplated.

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800 MOTORBUSES FOR PARIS.

The Paris (France) General Omnibus Company will put 800 more motor buses into service between now and the middle of the year. The De Dion-Bonton Company has received an order for 300 of these.

Two negroes, perpetrators of a daring daylight robbery at Fort Worth, Texas, recently, were pursued by a motor patrol and captured before they could make their getaway through the underbrush in the river bottom.

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LONG TRIP BY A "WALKER."

A run from New York to Boston, a distance of 252 miles, in 21 hours' actual running time, was the record recently made by a "Walker balance drive" electric wagon. It is worthy of note that during this journey only two charges were made, these being at New Haven and Springfield. The battery contained 138 A8 Edison cells; 5.2 ampere-hours were used per mile.

The driving mechanism of the car is particularly interesting, as all of the motive parts are in the rear axle and the rear wheels, with the exception of the batteries and the connecting wires. The motor on the rear axle has a direct drive of two pinions running to idler gears in the wheels. These latter engage with an internal gear just inside the rim of each of the wheels, propelling the car by this means.

The car weighs 3,000 pounds; the load brought from New York weighed 2,800, and the weight of two men was added, yet the machine took every hill and every bit of muddy going with the greatest ease. The start was made Monday, March 11, at 9:30 a. m. Mechanics' Building, Boston, was reached at 3 o'clock Tuesday afternoon.

One noteworthy feature of the car is its high clearance. The lowest point of the machine proper is in the rear axle, where is situated the driving motor, yet that is 14 inches above the ground level. This feature does not prevent a low center of gravity, however, as the batteries and bulk of the load are carried well down.

An interesting fact which goes to show the reliability of a vehicle of this type is that in spite of bad roads, which were in places regarded as impassable, no mechanical difficulties of any kind were experienced during the entire trip.

The "Walker balance drive" electric wagon is made by the Walker Vehicle Co., of Chicago.

CLARK JOINS NEW DEPARTURE

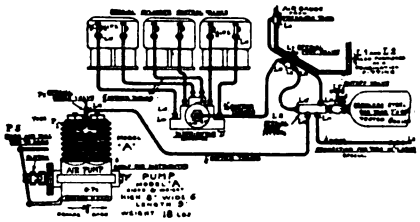
C. L. Clark, formerly with the Driggs-Seabury Company and the Kelly Motor Truck Company, has joined the laboratory staff of the New Departure Mfg. Co., Bristol, Conn., makers of New Departure ball bearings. Mr. Clark is a metallurgical engineer and was graduated from the Case School of Applied Science at Cleveland, also the Ohio State University.

The Singer Sewing Machine Company, of Cleveland, Ohio, has installed a 1,500-pound Chase motor wagon in its delivery service.

Walter Christie is said to be organizing a company to manufacture a simplified form of front-wheel-driven motor wagon.

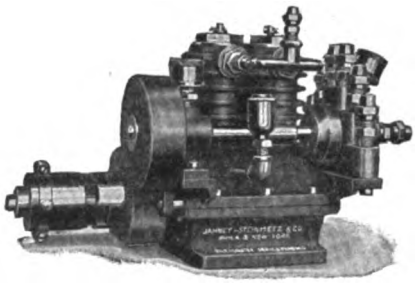
J-S STARTER AND INFLATER.

With the increasing public demand for self starters on all types of motor wagons, more especially at present on motor fire apparatus, a description of the Janney-Steinmetz motor starter and tire inflater will be of timely interest. This device, which comprises a high pressure air compressor, rotary distributer, air line valves, pressure tank and the necessary special fittings, possesses the merit of safety, reliability, high efficiency and consequent economy, without the disadvantages of weight, expense and complication of some other types now on the market.

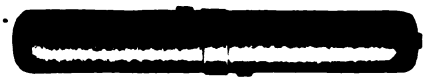


Installation of the Janney, Steinmetz & Co. motor starter and tire inflater.

This apparatus is the result of more than two years of painstaking evolution, and is protected by U. S. patents issued and pending. It can be conveniently located under the bonnet of the ordinary type of machine. The base is less than 5 inches square. The compressor, with its rotor, gears and valves complete, has a length of 8 inches and a width of 7 inches. The weight is less than 20 pounds. The single cylinder model weighs less than 10 pounds. The tank can be made to a size that will fit into the open space under the chassis. The sizes recommended are 30 to 48 inches long and 7 inches diameter. Tanks are made of seamless steel.



The Janney-Steinmetz motor starter and tire inflater.



Seamless steel leakless tested tank for compressed air motor starter.

Referring to the diagram of the installation, the methods of connecting up and operating can be understood from the following:

Mount the pump distributer unit on any suitable shelf or bracket, and gear it or direct-couple it to the motor so that the distributer rotates at camshaft speed, and runs all the time, while the pump is thrown in and out of action at will. Silent chain or sprocket drive can be used to advantage.

Locate the gauge on the dash in any preferred position and attached to the tank or the outlet pipe, but not to the pump line.

Mount the foot valve under the foot board so that the push button will project through at any convenient place.

Support the tank in any preferred position and connect it to the foot valve so that the pressure will come against the valve. Connect the other end of the foot valve to the single opening in the distributer cap.

Screw the cylinder valves into the cylinder priming cock openings (¼ inch pipe thread) and connect a copper pipe from the distributer connections to the inlet end of each valve in the cylinders, in the order of their firing. If it is desired to retain the priming cocks, use a ¼ inch T-fitting in the cylinder and attach the automatic valve on the side and the priming cock on top of the fitting.

Use ¼ inch O. D. annealed copper tubing from pump to tank and from tank to gauge and from tank to tire inflater, and ⅜ inch O. D. annealed tubing everywhere else.

In setting the distributer valve bring the flywheel of the motor to dead center and connect one outlet of the distributer to the cylinder which is under compression, then turn the valve until it is just beginning to open on that cylinder. This will make the ports open in the right order for the other cylinders when connected in the order of their firing. Before the cap is screwed on the distributer and the pipe from the foot valve attached, it is wise to turn the motor over and watch the distributer valve, noting whether it opens the ports leading to the cylinders in the order of their firing.

In using the distributer alone there need be no hesitation in mounting it on the battery timer stem, as this patent distributer is so designed and built that it will bring no undue strain on these gears.

The tire inflating outlet should be located in the foot valve line and the special Schroeder valve on end thereof can be made fast to any convenient and accessible point of support.

PIGGINS CO. INCORPORATED.

The Piggins Motor Truck Company, recently incorporated at Racine, Wis., is already building extensive additions to its present factory. The company makes five models of motor wagons, from 1,000 pounds to five tons load capacity.

The officers of the company are: E. N. McNab, president; F. H. Piggins, vice president; Chas. R. Piggins, secretary and treasurer; Geo. L. Lavery, Jr., sales manager.

Youngstown, Ohio, used a motor wagon, loaned by the Driggs-Seabury works, to distribute ashes over the bad thoroughfares during the recent wintry weather. The city may shortly be in the market for some machines.

Davidson county (Tennessee) asylum has ordered a motor ambulance.

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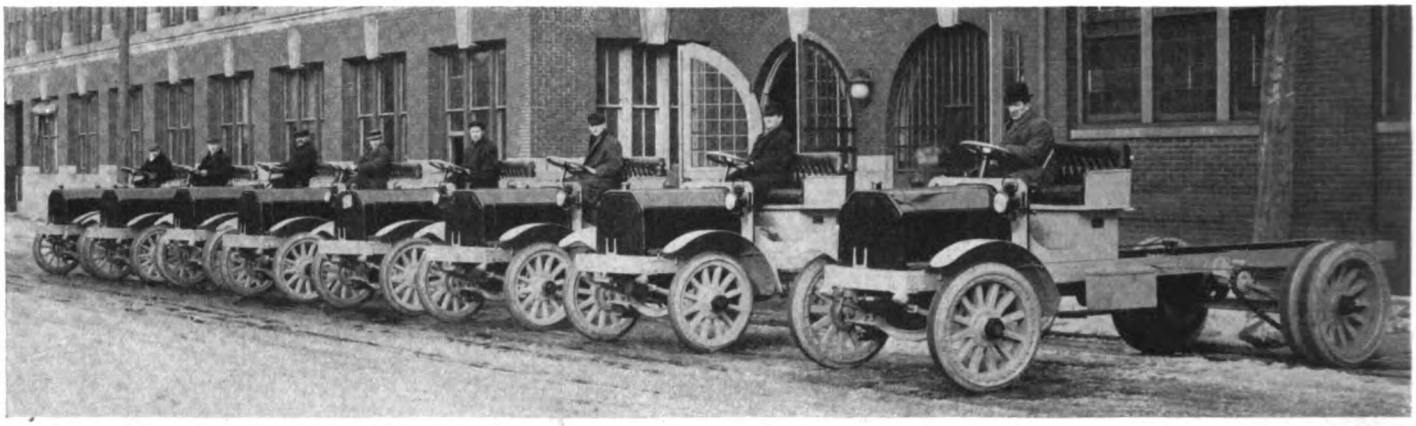

Eight Peerless power wagons for the American Express Co. This is the first part of an order for ten placed after five others had been in service.

BIG ORDER FOR PEERLESS.

Eight motor trucks of an order for eleven placed recently by the American Express Company with the Peerless Motor Car Company of Cleveland have just been delivered.

The American Express Company was one of the first large corporations to adopt motor trucks, and since it began experimenting years ago has tried out almost every important make. These have been operated under the scrutiny of its engineers and traffic experts, who have been able to make the most accurate estimate of motor truck service as compared to other methods of heavy hauling.

Five Peerless trucks were purchased some time ago and had been in service for a considerable period when the recent order was placed. The trucks are being fitted with bodies in New York and will be operated in that city by the American Express Company and the Westcott Express Company.

A STRENUOUS ROUTE.

The accompanying photograph illustrates what is probably the most strenuous regular truck route in the United States, perhaps in the world.

Mount Hamilton is the site of the famous Lick Observatory, and a KisselKar 3 ton truck is in service hauling supplies from San Jose, 27 miles away.

The record for the trip is 6 hours 25 minutes, carrying a 4½ ton load, which is 1½ tons in excess of the truck's 3 ton capacity. The first 20 miles were covered in three hours, and the last 7 miles, in which there is a raise of 2,200 feet and many turns, some of them dangerous, occupied 3 hours 25 minutes. Mt. Hamilton is 4,209 feet high, and the KisselKar, a 3 ton truck, makes six trips a month.

THE LANSDEN COMPANY.

The Lansden Company has increased its capital stock to $1,000,000, and will move into a new factory on May 1. The company expects to have an output of at least 1,000 electrics for 1912, rating from 750 pounds to 5 tons. The 5 ton truck is a new model. An Edison storage battery has just been put on the market that is heavy enough for trucks of this rating. C. W. Hotz, of Chicago, is president; W. L. Case, vice president and general manager, is located at Newark; H. E. Doty, sales manager, was formerly with the Federal Company.

The International Motor Company has no business connections with the Lansden Company and will neither control or manufacture trucks for this firm. The reason that this rumor was started is that several men who are stock holders in the International Motor Company are also interested in the Lansden Company.

Hereafter the well known Reliance trucks will be identified by a plate containing only the inscription—G. M. Co.

Kissel motor wagon in extremely hard service.

MOTOR TRUCK FORGING AHEAD.

"The pleasure automobile has been in the foreground long enough, and it is time for the motor truck to come to the front," said T. R. Lippard, vice president and manager of the Lippard-Stewart Motor Car Company of Buffalo, in a recent interview.

"In the automobile business we have an instance of the reversal of the old motto of 'business before pleasure.'

"The automobile got the start because it ministered to the pleasure-loving instincts of the people. The motor truck was meant for business purposes, and business men are conservative.

"The merchant who had bought an automobile and careered joyously through the country in it was slow to contemplate the abandonment of horses and wagons for the transportation of his goods. The change would involve expense. He would have to dispose of the plant he had, at a sacrifice perhaps, which certainly would be more costly at the outset.

"He is gradually becoming converted. Though the initial cost of the motor truck may be greater, it is an untiring servant. Unlike the horse, it can work all day long. It is never so galled and footsore that some human policeman has to order it back to the stable, and it does not obstruct the street like the horse and wagon.

"The public is for the motor delivery car because it would reduce the traffic congestion in cities. That ought to but may not appeal forcibly to the merchant. The saving in money through the motor car must appeal to him mightily when he has been made to see it.

"It is well for automobile dealers that the horseless vehicle is being accepted for business uses. A large and profitable market opens before them, even if the public should profess itself fully stocked with automobiles, or be slow, because of a sudden streak of economy, about buying new ones, for the new demands of trade will mean good business for the dealers."

Five Gramm power wagons are being used in hauling gravel for the Sixth avenue bridge across Hangman creek in Spokane, Wash.

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STEBBINS' NEW TERRITORY.

H. S. Stebbins, of General Motors Truck Company, has been assigned to New York as Eastern District Manager of the above company. The rapidly increasing business in the Eastern territory has made this move necessary and Mr. Stebbins will have charge of all the Eastern interests, both in the development and the administration of the business.

Mr. Stebbins has long been an expert in transportation problems, having been for years the Traffic Manager of one of the leading railroads of this country and his extensive experience in this, as well as in the power wagon business, eminently qualifies him for this important position which is looked upon as a step forward for him. He has for several years been the Traffic Manager of General Motors, which position he still retains in connection with his other duties.

NEW GOODYEAR BRANCH.

The Birmingham, Ala., branch of the Goodyear Tire & Rubber Company will occupy its new quarters at 420-422 South 20th street on April 1. The new location is a two-story building 48 by 90 feet. It is arranged in the uniform style of all the Goodyear branches, and when completed will be one of the prettiest and most up-to-date of the Goodyear branch offices.

FLEET OF DETROIT ELECTRICS.

Carson, Pirie, Scott & Co., famous the country over as one of the finest department stores in Chicago, maintains an immense delivery system. Part of the transportation equipment consists of 22 "Detroit Electric" motor wagons of 1,000 pounds' capacity, made by the Anderson Electric Car Co., Detroit, Mich. These machines have been in service for upwards of a year and have fully upheld the reputation of their owners for reliability and promptness in delivery. Our picture shows 15 of these 22 vehicles.

One of the 20 Waverleys ordered by the Fleischmann Company.

BALL BEARING LITERATURE.

A new 16-page bulletin recently issued by the S. K. F. Ball Bearing Co., 50 Church street, New York City, for distribution to the trade, describes S. K. F. single and double thrust ball bearings. This bulletin is filled with sound arguments advocating self-alining double thrust ball bearings and single thrust bearings with or without a self-alining seat. It is well illustrated.

FLEET OF 20 WAVERLEYS.

While the Chicago Show was in progress word was received from New York of an order placed with the Waverley representative in that city for ten electric delivery wagons of the shaft drive type that has attracted so much attention wherever it has been demonstrated.

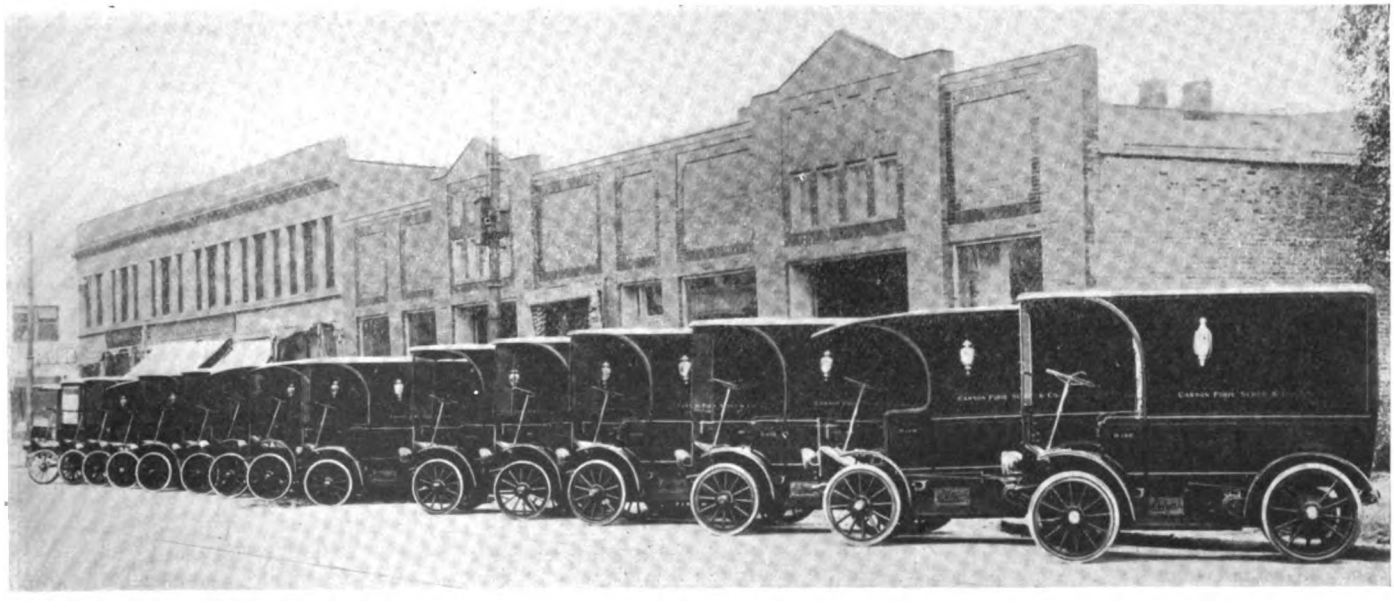
This was followed a few days later by a second order for ten, making twenty in all. These orders were placed after long experiment with a Waverley running in competition with other electrics and several gasoline trucks, in the operation of which the Fleischman Company learned about all there is to know about motor truck delivery.

This decision in favor of the Waverley was a well earned compliment and shows the practical advantages of a mosquito fleet of small, speedy electrics so simple in operation that they may be driven by messenger boys if need be.

The distinctive feature of the car is its shaft drive that makes it as noiseless as any "Silent Waverley" brougham milady drives.

Simplicity of handling, serviceable speed and unusual economy of operation are other points claimed for it by the Waverley Company.

East St. Louis has a motor ambulance.



A fleet of 15 (out of 22) "Detroit Electrics" in the service of Carson, Pirie, Scott & Co., Chicago.

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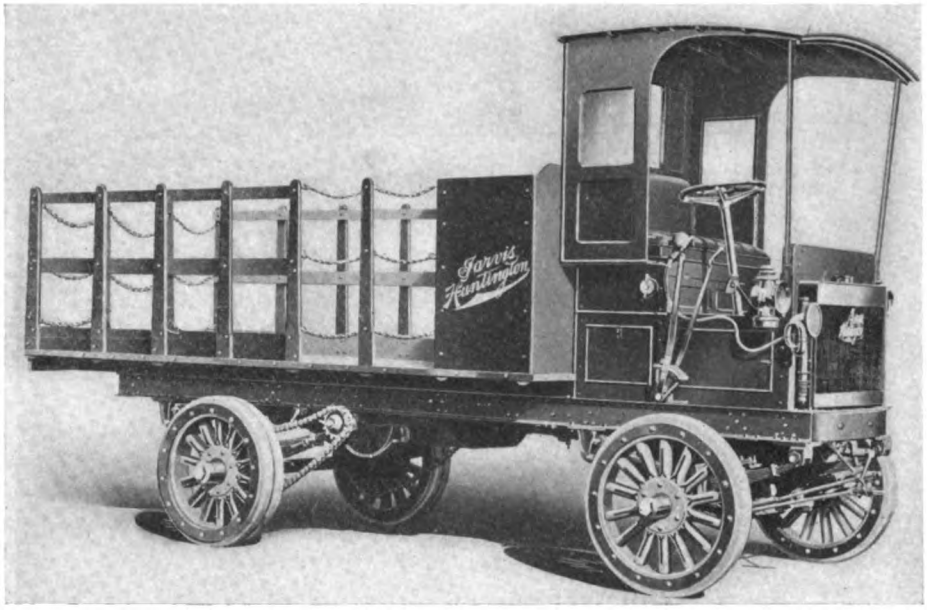

Jarvis-Huntington power wagon.

NOW SAURER-MACK-HEWITT.

The International Motor Company announces that it has just acquired the properties of the Hewitt Motor Truck Company, all the business of this concern having been taken over commencing March 1. Sales and Executive Departments on that date were amalgamated with the International Motor Company whose headquarters are at Broadway and 57th street, New York City, with works at Allentown, Pa.; Plainfield, N. J., and New York City. The association of the Mack, Saurer, and Hewitt trucks makes the position of the International Motor Company one of the most formidable, if not the most formidable, single factor in the motor truck industry of this country. The range of sizes which this organization offers will include every variation in live load capacity ranging from 1,500 pounds up to ten tons. The acquisition of the Hewitt interests especially strengthens the line of heavy duty trucks offered by this organization as the Hewitt trucks have made a most enviable reputation in the last few years, being in service of some of the largest wholesale coal dealers, lumber merchants and engineering contracting firms.

INSTRUCTIVE TIRE BOOKLETS.

Many are the booklets on tires and tire troubles that are prepared every year by the tire manufacturers. Web. Brown, advertising manager of the Republic Rubber Co., Youngstown, Ohio, has improved on the general run of this kind of literature and has prepared a series of tire-service booklets which are distinctive and extremely attractive in design and make-up. The first of these booklets is entitled "The Reasons." It has 16 pages and cover and illustrates the various ways in which automobile tires become worn and injured. This booklet is to be distributed by agents when people make complaints about the service given under unreasonable usage. It is a radical yet sensible departure in booklet making and has a strong advertising value.

Another attractive Republic tire booklet is called the "Two-in-One." It covers briefly the Republic Staggard Tread Tire and the Republic Black-Line Red Inner Tube.

Copies of the "Two-in-One" booklet will be sent free to motorists or the advertising fraternity on request. Address the Advertising Department of the Republic Rubber Co., Youngstown, Ohio.

THIRD REORDER IN A MONTH.

For the third time in a month, the Barrett Manufacturing Company, the big roofing and tar products concern, has placed a repeat order for Alco trucks, the latest contract specifying two of 5 tons' capacity and two of 6½ tons for the Boston offices. A week previously two machines were purchased for the Philadelphia service, and shortly before that one was stipulated for the Chicago branch.

This makes a total of eleven Alco trucks in the service of that concern, the first machines installed having been in operation for more than a year. It was on the basis of the saving effected by these trucks that the others were added.

P. S. B. BRANCH IN CHICAGO.

Owing to the increased demand for the "Diamond Grid" battery in Chicago and the West, the Philadelphia Storage Battery Company has found it necessary to open an office and supply depot in Chicago. The office is at 516 The Rookery Building. D. C. Arlington is in charge.

Over 1,000 cabs in New York alone are using the Fisk bolted-on tire and Fisk removable rim. The Fisk Rubber Company recently closed a contract for equipment with a big Detroit taxicab company.

SEWELL CUSHION WHEEL.

The "Wheel Within a Wheel."

An ingenious type of construction is the Sewell cushion wheel, or the "wheel within a wheel," as the makers aptly call it, which is being made by the Sewell Cushion Wheel Company, Detroit, Mich., for use on motor wagons, buses, fire apparatus, etc.

Referring to the illustration, the extreme right side of the dissected part shows the felloe of the inner wheel which has a metal tire showing directly under the rubber rolls, making it a wheel intact. The rubber rolls show the manner in which the resiliency of the wheel is obtained, between the inner and the outer felloes. The next feature shown is the rubber flange, or gasket, which encircles the wheel on both sides, and connects the inner and outer felloes, making the opening containing the rubber rolls absolutely proof against air, dust and moisture. This feature insures an unusual life for the rubber rolls. We now come to the two steel bands, of which there are two more on the opposite side of the wheel—these are bolted through to each side, holding the rubber flanges and two felloes in place—in addition the bands on the inner felloe extend above the felloe for one-half inch and the outer band extends below the outer felloe one-half inch. These extensions pressing against the ends of the rubber rolls prevent all lateral or side motion between the mner and outer felloes and relieve the rubber flanges from all strain, keeping the wheel on an even tread. The curved steel rim tire holder and solid rubber tire are shown at the top and easily understood.

Sewell cushion wheels are constructed according to all makes and sizes of tires.

The Sewell cushion wheel.

LOZIER 5-TON TRUCK.

In the motor wagon specification tables in our March issue the Lozier machine was listed as a 4-ton model. This is incorrect. It should have been included in the 5-ton class.

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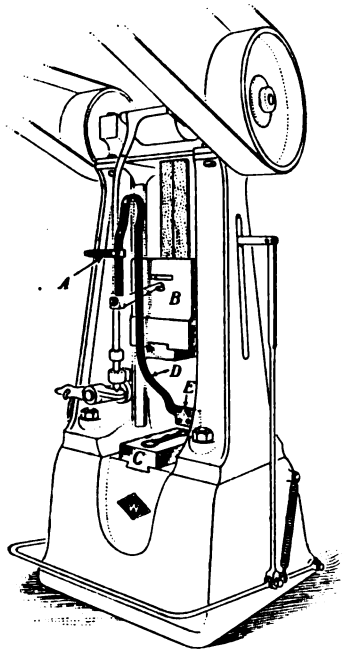
NEW SAFETY APPLIANCE.

Automatically Prevents Accidents in Drop Forging Shops.

Drop forgings which require little machinery are frequently furnished to gauge sizes and therefore are "restruck" in forging dies after the "flash" or excess of metal has been removed. In doing such work the operator quite often meets with a more or less serious injury from an untimely falling of the ram. The contrivance here illustrated is designed to prevent accident in the finishing of "precision product" in drop forging work of this kind.

The spring steel device shown in darker outline in the drawing is clamped to the guide or upright at A. When the ram B descends, its contact with the device at D



Drop press with safety device.

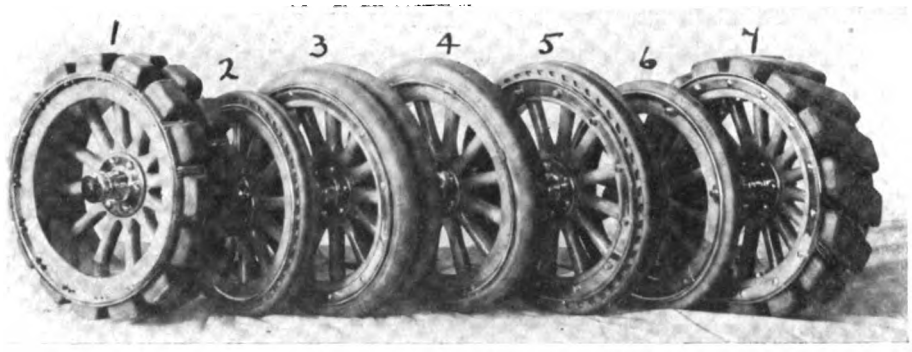
automatically forces the hand of the operator to a place of safety C, and the leather pad E modifies the force of the blow to the operator's hand.

This device, which is made by J. H. Williams & Co., Brooklyn, N. Y., is meritorious and is certainly cheaper than accident insurance and defending or settling up damage suits.

CHICAGO PACKARD OPENING.

The Packard Motor Car Company, of Chicago, held its "First Annual Opening" during the week beginning February 22 last. The entire building was thrown open for inspection and several educational features not displayed at the shows made a profound impression on hundreds of interested visitors. The decorations were in keeping with the high quality of Packard workmanship and design.

New York legislators are endeavoring to pass a bill requiring tire makers to stamp all tires with the date of manufacture. What are tire guarantees for?



The Goodyear 1912 tire products.

UNIVERSAL JOINT MAKER.

The Blood Brothers Machine Company, manufacturer of universal joints at Kalamazoo, Michigan, has during the past six months more than half doubled the capacity of its plant by building several new additions and adding a lot of new machinery. The company is now running its factory 23 hours a day, but still finds it hard to keep up with orders. The factory is devoted exclusively, at the present time, to the manufacture of universal joints.

GOODYEAR 1912 TIRE LINE

The picture herewith presents the Goodyear motor wagon tire offering for 1912. From left to right these tires are: (1) Individual block tire; (2) Goodyear-Motz cushion tire; (3) Goodyear demountable tire; (4) Goodyear metal base tire; (5) Goodyear-Motz fire department tire; (7) diagonal block tire.

Regarding the individual block tire, stress is laid on the fact that any one of the blocks can be removed and replaced if necessary without disturbing any other block. Each block has its own fastening plate, and the fastening device is extremely simple.

Popular interest is centering strongly on the Goodyear demountable truck tire—No. 3 in the picture—which is furnished in the single as well as dual type. Goodyear experts believe the time is coming when truck owners will consider and use only tires that are readily demountable. The Goodyear demountable is recommended by its makers as simple of operation, guaranteed for 10,000 miles, and adaptable to the S. A. E. standard wheel.

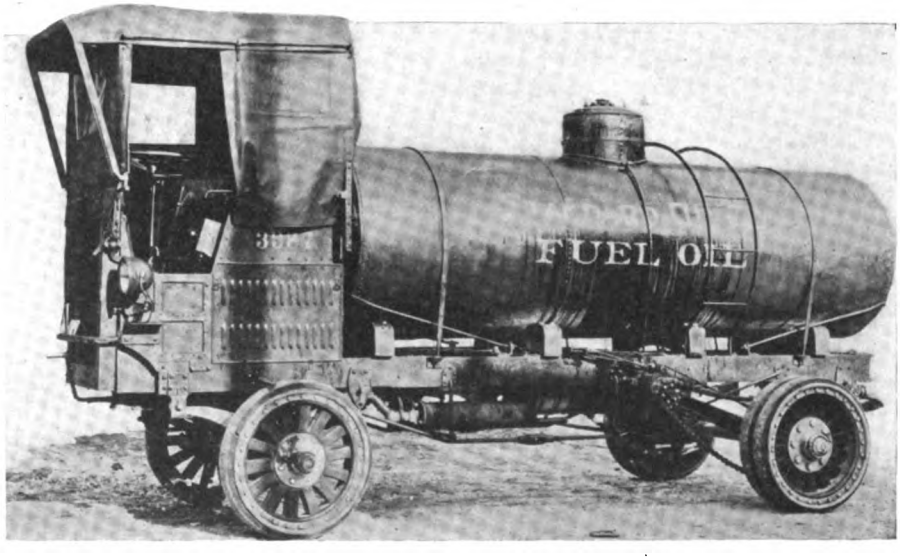
The metal base tire is of the permanently fixed-on type, and finds favor with truck owners who prefer that type. Goodyear men are enthusiastic over their 1912 line and report excellent business.

The Goodyear company has prepored for distribution to the trade a splendidly illustrated catalog showing its various products.

U. S. TIRE CO. APPOINTMENTS.

T. R. Burton, manager of the Pittsburg branch of the United States Tire Company, has been appointed assistant to O. S. Tweedy, Eastern District Manager of this concern. Mr. Burton will move to New York. His successor in Pittsburg will be C. C. Gehring, who during the past year has been connected with the United States Tire Company's Philadelphia branch. J. C. Weston, Western District Manager, has moved from San Francisco to Chicago to assume charge of the Central District, and C. A. Gilbert has gone from New York to San Francisco to take Mr. Weston's place.

South Station, Boston, Mass., has adopted electric baggage trucks.



G. M. C. truck delivered to the Standard Oil Co. of Kansas City.

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G. V. Industrial trucks in service.

G. V. INDUSTRIAL TRUCK.

A Cost-Cutting Machine for Shipping Departments and Inter-Department Transfers and Deliveries.

A boon to concerns which have large shipping and internal transfer and delivery departments is the industrial electric truck of 2,000 pounds' capacity, recently designed by the General Vehicle Company of Long Island City, N. Y., a firm whose name is a household word to any one who knows anything about electric wagons in this and many another country.

The use of such machines on docks, in warehouses, railroad depots, etc., will result in very materially cutting the cost of handling freight before and after it goes on the road; while in conjunction with motor wagons and machine loading methods—as with the well known battery truck crane, for example—they afford the ideal system for freight handling outside the scope of railroad and steamship facilities.

Being propelled by electricity, the G. V. industrial truck is practically noiseless in operation, free from noxious fumes, and absolutely without fire risk. The operator rides on the machine at three times the speed he could push a warehouse truck by hand, and always has the vehicle under perfect control, for starting and stopping or steering around corners. The simplicity of operation is such that even the average baggage porter or freight handler can become an expert driver in 48 hours. A few of these machines in the average large warehouse would not only accelerate the rate of work and cut down the labor expense but would materially relieve congestion and in effect increase the capacity of the whole establishment. The cost for current consumption is very small.

The following is abstracted from the specifications: Loading space, 7 feet by 4 feet; capacity, 2,000 pounds; weight, 1,750 pounds; battery, 44 cells, 5 G. V. S.; battery capacity, 48 ampere-hours; voltage, 115; amperage, 6; motor, 85 volts, 10 amperes, 1,000 revolutions per minute; rated speed on level, fully loaded, 7 miles an hour; mileage capacity per battery charge, 25 miles.

For railroad work a smaller size truck is built—approximately 3 feet 7½ inches by 6 feet. Platform sizes up to 7½ feet long can also be had.

BUSINESS-LIKE METHODS.

Gleeson Murphy, vice president of General Motors Truck Company, left Detroit recently for a trip to Boston, Philadelphia and New York, where he will hold important conferences with the Eastern selling representatives of the above company.

This mission is really the beginning of an unique educational campaign. His idea is to thoroughly give every manager and salesman in the G-M-C truck organization complete knowledge of the responsibility, permanency and manufacturing scope of General Motors Truck Company, and to this end, Mr. Murphy will give a series of talks at each point visited. He will also touch upon local conditions and discuss other features of interest to the branches.

At a future date, Mr. Murphy will be followed by expert engineers in both the gasoline and electric field, who will discuss G-M-C trucks and give such technical information as will enable the salesmen not only to become more proficient in talking the various models made, but will give them a better understanding of transportation problems as they affect individual companies.

The service system inaugurated by this company will also be discussed. This is an important branch, analyzing the needs of any business and making such transportation recommendations, either gasoline or electric, as are best adapted.

The engineering corps will be followed by representatives of the sales department and other business authorities, who will discuss branch management and salesmanship. This series of talks will not only tend to draw the various branches of the business together in better understanding, but the G-M-C agents will be in a position to talk on transportation problems with those interested in a highly intelligent manner.

NEW LINCOLN AGENCIES.

Undoubted evidence of the progress being made by the Lincoln Motor Car Works, 1346 W. Harrison street, Chicago, Ill., is the ever-increasing number of good agency connections being closed by this concern.

Among the latest Lincoln dealers are: Norwood Brokers, 408 Continental Building, Baltimore, Md. (for Maryland and District of Columbia—a Washington, D. C. branch will soon be opened); V. H. Steckel, Steckel Motor Truck Co., Philadelphia (for eastern Pennsylvania and southern New Jersey); S. Reese Machine & Tool Works, Plymouth, Pa. (for Wilkesbarre and vicinity). Mr. Reese has just received a carload of the 1912 models, and will open a new salesroom in Wilkesbarre as soon as a suitable location can be found. The Windsor Mfg. Co., Windsor, Ont., has also accepted a Lincoln agency, and will open a branch in Toronto on or about May 1.

The Lincoln Motor Car Works make light gasoline motor wagons of 500 to 800 pounds' capacity, with either open express or panel top body. The only cheap thing about them is the price.

ANOTHER SCRIBE FOR REMY.

The predilection of the Remy Electric Company for newspaper men is evident by the enrollment of W. D. Edenburn as publicity and assistant advertising manager for the well-known magneto company at Anderson. Mr. Edenburn leaves the Indianapolis "Sun" where he was manager of the automobile department. He is the sixth newspaper man to join the army of Remy sales and advertising forces this year. He was formerly automobile editor of the Indianapolis "Star," where appeared many of his expert articles on racing, shows and features of automobile life. When automobile editor of the "Star" he was one of the active promoters of the idea of the Four-State Tour which developed into one of the most important tours of the Middle West in 1911. His new position with the Remy company will give him even broader scope in the promotion of plans for the general good of industry.

Edinburgh (Scot.) will probably replace its cable cars with gasoline-electric buses of the Tilling-Stevens type.

White machines are being used in the motor bus service recently installed in Kenosha, Wis.

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NEW SPEED GOVERNOR.

A speed governor so constructed that when a truck reaches a certain speed it will automatically cause a shrill, piercing whistle (similar to a siren horn) is a practical and exclusive feature of the new light delivery car to be manufactured by the General Industrial and Manufacturing Company of Indianapolis, Ind.

This timely warning not only safeguards the public against reckless drivers, but also informs the driver that he is exceeding a safe and reasonable speed. It will also be a boon to the truck owner, as it will prevent accidents, reduce the wear and tear on the car, and add years to its usefulness.

In New York, Boston, Chicago, and Philadelphia this feature will be doubly effective, as all these cities have ordinances forbidding blowing horns of this nature.

MONITOR OFFICES IN CHICAGO.

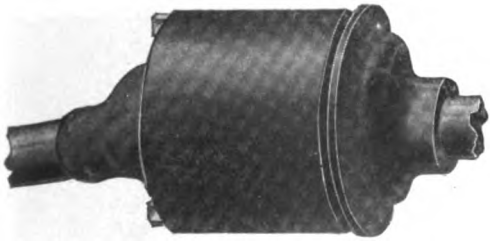
The Monitor Automobile Works, of Janesville, Wis., have moved their general sales and publicity department to Chicago, and from now on all business pertaining to sales and agencies will be conducted from their new sales headquarters at 1421 Michigan avenue, Chicago, Ill.

J. E. Norling, secretary and treasurer of the company, will manage the Chicago office, and will have as sales manager F. W. Stewart, formerly with the Badger Motor Car Company. Mr. Stewart is well qualified for the position, having had several years' experience in the automobile business.

Mr. Norling reports many sales as the result of the Monitor exhibit at the Chicago show, and from present indications he believes that the demand for motor wagons of a reliable make will be far greater than the manufacturers can supply.

MOTORS FOR ICE HAULAGE.

The Hygienic Ice Company, of Chicago, has just placed an order with H. Paulman & Co. for 5 ton capacity Pierce-Arrow worm-driven motor wagons for immediate delivery, for use in the approaching ice season. This company experimented with motor truck delivery for its ice last season and found it so satisfactory to its custom-



Blood Bros. universal joint—style J, slip or non-slip. Patent applied for.

ers in the way of service and ice shrinkage that it was found necessary to add materially to this line of equipment this year to take care of enormous business brought to it by the use of the power wagon.

UNIVERSAL JOINTS.

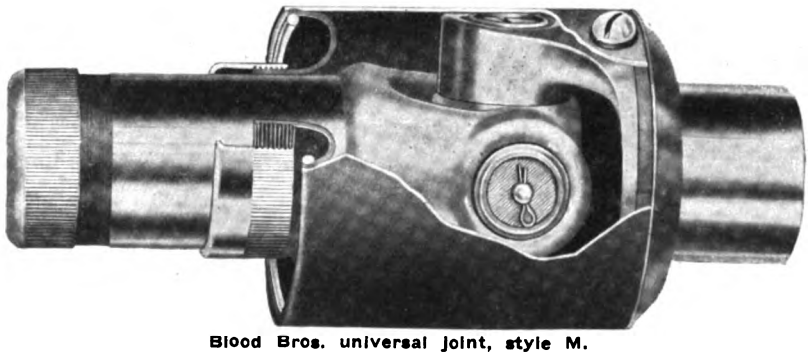
In connection with the illustrations of universal joints shown herewith, the manufacturer, Blood Bros. Machine Co., Kalamazoo, Mich., maker of automobile parts, supplies the following particulars:

"The style A joint is the first one we put on the market and has been our old standby ever since 1904, which is the year we first introduced it to the public. It has won favor with manufacturers of automobiles on account of its very large pivotal bearings, which are all made of steel, bone hardened and ground accurately to size, and all interchangeable with each other. These bearings are lubricated in the best possible way that has ever been devised, which is by patent grease caps that hold the lubricant directly on to the bearings so the last drop can be used to oil these parts. They also make the bearings perfectly dustproof.

Blood Bros. universal joint with improved grease caps—style A.

"The style M joint is one we brought out about two years ago to supply the demand for covered joints for those who wished to have the benefit of the large pivotal bearings and center block (which is also a working bearing) that are used in the style A joint, and at the same time have a joint that was smooth on the outside. Although this joint is made to hold the lubricant within a metal case, we do not claim that it has any advantage over the style A in lubricating the bearings.

"The style J is another type of covered joint that we brought out about five years ago, which is of the type that uses parts pivotal and part sliding bearings. Where angles are not too great, this makes a very durable and satisfactory universal joint, but we do not recommend it for angles of over 5 degrees. Where angles are nearly in a straight line, we can recommend the style J joint, as it is well adapted to use as a slip joint on account of the sliding end of the shaft working directly between the pivotal bearings and in this way making a nicely balanced joint."



Blood Bros. universal joint, style M.

EVANS CLUTCH IN DEMAND.

The Merchant & Evans Co., Philadelphia, Pa., is now producing "Evans" model "Hele-Shaw" clutches (pressed steel case—patented V shape disks) for motor trucks at the rate of over 500 per month, which requires the operation of the plant on a full day and night schedule. There are sufficient orders on hand to continue this schedule for the entire year of 1912.

The demand for this clutch, due to its high efficiency, has increased enormously in recent years, and at present it is used by about 75 of the leading motor truck builders of the United States.

AMERICAN EXPRESS BUYS G. V.'s.

The American Express Co., which will begin its delivery service in Baltimore under contract with the Western Maryland Railroad on April 1, will use motor trucks. The company has purchased 25 electric wagons from the General Vehicle Co., Long Island City, N. Y., for this service. Of these 22 are of 2-ton capacity and 3 are of 3½-ton capacity. This company is already operating 30 electrics in other sections of the country.

NEW MGR. FOR J. H. AUTO CO.

A. Reis Meyer is now associated with the Jarvis Huntington Company as general manager. The factory and sales office are at Huntington, W. Va.

Lexington, Ky., recently received its first motor ambulance.

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BUSINESS IN CANADA.

Fred J. Titus, traveling representative of the Alco, recently gave an interesting insight into motor truck conditions in Canada on his return from an extensive trip through the dominion.

Mr. Titus told of two veteran horse users of Toronto who have adopted motor trucks on a large scale as the most effective hauling system. He told also of the introduction of oak blocks to replace the block rubber tires used on trucks in this country and declared that much interest is being shown in Canada in the test being given the wooden tires.

The demand for American motor trucks and high priced motor cars in Canada is growing rapidly, said Mr. Titus; due, he declares, to the general prosperity there. Within two weeks he closed sales totaling $71,000.

"I found that Canadians are open-minded, both toward commercial and pleasure motor vehicles," said Mr. Titus. "Conditions there are much as they were here six or seven years ago, when the great demand for both touring cars and motor wagons swept over this country.

"One interesting experience I had with J. B. Smith, head of a large lumber concern. For 60 years he has used horses and is famous for the fine type of draft animals in his service. He has just bought four motor trucks which he will equip with hydraulic lifts for moving lumber on and off the trucks.

"There is also James Crow, who is well known in this country for the blue ribbons his horses have taken at horse shows in New York. He has given up dealing in horses and has taken an agency for motor cars and trucks."

"BALL" TRANSMISSIONS.

Under the above title the New York Gear Works, Brooklyn, N. Y., has recently issued for distribution to the trade an attractive illustrated booklet describing the well-known "Ball" planetary transmission gear and jackshafts for motor vehicles. It is of interest to note that the New York Gear Works are the oldest manufacturers of the all-spur planetary transmission, being the inventors and first to construct and operate a successful planetary gear of this type.

A CORRECTION.

In our March issue, the newly-designed 1,500-pound, 2,000-pound and 3,000-pound capacity motor wagons made by the Ideal Auto Truck Company, Fort Wayne, Ind., were incorrectly described in an advertisement as having a one-cylinder motor. The Ideal motor wagons are equipped with 4-cylinder engines of the most modern design. Long stroke and ruggedness of construction are noteworthy features.

It is reported that more than half the motor truck produced this year in Germany have a capacity of 3 tons or more.

"INDIANA" TRUCKS IN WINTER.

"Indiana" motor wagons, made by the Harwood Barley Mfg. Co., Marion, Ind., made an enviable record during the big blizzard in the week of Feb. 22, and attracted a lot of voluntary local newspaper publicity accordingly. One of the new 1½-ton "Indiana" trucks was used to carry home the company's girl employees one night when the street car service was suspended on account of snow, and the "Indiana" fire motor used in Marion answered alarms when the horse apparatus were unable to reach the scene of the fire. Some of the snow drifts were three feet deep, but even these did not hinder the Harwood Barley motor wagons from getting through.

"Indiana" fire motor coming out of fire headquarters, Marion, Ind.

"THERE" IN AN EMERGENCY.

The motor truck in the role of an ambulance may be a new one, but is, nevertheless, worthy of note, especially in view of its remarkable performance.

The plant of the Spink Manufacturing Company, Philadelphia, was recently incapacitated by a broken cylinder. A new one could be procured only at Newark, a distance of 95 miles. Being afraid of any unnecessary delay, it was decided to send the company's 3½-ton General Motors truck after it rather than trust the express companies for prompt hauling. The start was made from Philadelphia at 3 a. m. in a rain and wind storm with a crew of three men. They arrived at Newark at 2 p. m., secured the new cylinder, and started back at 5:40. By this time the rain had changed to snow and hail, and many difficulties were encountered on the return trip, broken trees and telephone posts making it necessary to use an axe to chop them out of the way. They arrived in Philadelphia at 1 o'clock the next day, after being up all night. The machine covered a distance of 170 miles, and, considering the condition of the roads, made good time.

"Indiana" motor wagon plowing through the snowdrifts.

NOTEWORTHY PARTNERSHIP.

Henry F. Donaldson and Joseph Tracy have associated themselves as automobile engineers to undertake consultation, research and development work, design and construction, laboratory and road tests. For the present the headquarters in New York will be in the office already established by Joseph Tracy at 116 West 39th street. The testing laboratory in New Jersey will be maintained as heretofore.

OLD BELL FOR FIRE MOTOR.

The fire department of the old town of Ipswich, a suburb of Boston, has put into service its initial horseless equipment. It is a combination hose and chemical wagon mounted on a General Motors Truck Company 2 ton chassis.

The new fire wagon is very complete, including an electric device for searchlights and signaling. It carries two 25-gallon tanks and 500 feet of hose. The citizens generally are very proud of their new possession. There is a bit of fire department history in connection with the motor driven piece of apparatus. It seems that the town of Ipswich purchased the old Barnicoat tub from the city of Boston, and when the hand tub, which was built in 1852, went out of commission, one of the members of the local fire company took possession of the bell on the old tub, keeping it as a souvenir. The owner of the bell presented it to the hose company and now it is mounted on the new fire wagon.

KNIGHT-ENGINED WAGONS.

The "Silent Knight" sleeve-valve engine, the entry of which into the pleasure car field has made such a commotion during the last year or so, has now been introduced into the world of the power wagon. Recent advices from England state that the Daimler Company will shortly place on the market a line of motor wagons of 1, 2, 3 to 4 and 5 tons' capacity, respectively, as well as a 40-passenger motor bus and a 36-horsepower agricultural tractor, all equipped with the Knight engine.

REPUBLIC PROGRESS.

The new Calender Building now under process of construction for the Republic Rubber Co., at Youngstown will, it is claimed, be the finest and most thoroughly up-to-date building of its kind in the world.

Starting from a very small plant a few

The advertising theme of many of the successful power wagon makers in Great Britain is "repeat orders."

"To do away entirely with horses in the Atlantic (Ga.) fire department," said Fire Chief Cummings recently, "would save the city about $25,000 a year."

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Motor Trucks

WITH the manufacturer, the merchant and the distributor today the question no longer is, "Shall I buy a motor truck?" but, "Which motor truck shall I buy?" The battle, if such it might be called, of motor vs. horse—has been fought and won, and the problem of the present is, what motor truck will give the maximum service in proportion to its initial cost and upkeep?

It is not only on the road, but also in the shop, that the inferior machine loses money, for to the loss of time and business when the truck is out of service must be added the expense of repairs.

GARFORD trucks are designed by engineers who have studied the details of transportation problems and know the type and character of machine best suited to your needs. The materials used in the construction of these trucks are the best obtainable for their respective purposes. For example—the connecting rods and valves are of nickel steel, the crank shaft is of open hearth steel, specially heat treated, and all metals are subjected to chemical and physical tests before being used. This trinity of efficiency is completed by the conditions and facilities of manufacture which demand the best efforts of every man connected with this company.

These elements of design, material and workmanship have always distinguished **GARFORD** products. Their combination makes it possible to build a motor truck that can be run with a minimum outlay for maintenance.

We build these machines of one and a half, three and five ton capacity, and furnish either a standard body or build one to meet your requirements. Catalogs and further information on application.

The Willys-Garford Sales Co.
Toledo, Ohio

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The Durable Dayton

Model H—Capacity 2 Ton
Model K—Capacity 3 Ton
Model M—Capacity 5 Ton

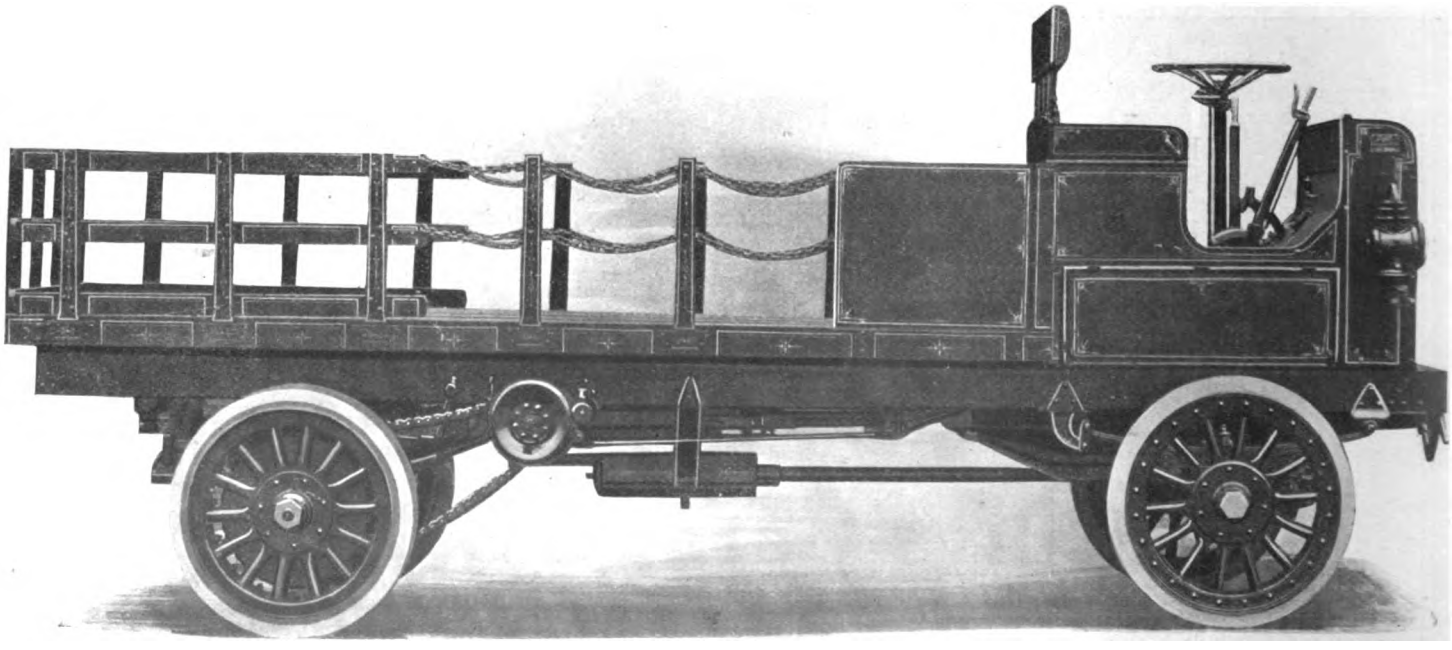
The most dependable line of *Specially Designed* Motor Trucks produced by any one concern in the industry.

The substantial merit of any motor truck lies in its regular work performance. Hence its record in service is of paramount importance.

The service records of all **Durable Dayton** models will bear the closest investigation. The machines are built to withstand the severest tests of duty, and are as economical as they are lasting. It is unnecessary to make the rate of depreciation high for **Durable Daytons.**

Dealers and other careful buyers of motor trucks will find in the **Durable Dayton** models all the characteristics which thoughtful design and experience can supply.

Write for List of Dealers and Satisfied Users



Durable Dayton Model K—Capacity 3 Tons

Please mention the "Power Wagon" when writing to advertisers.

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The Durable Dayton

How well the three-ton Durable Dayton compares with other models of like rating on the market may be inferred from the following telegram:

Chosen from Among 21 Competitors

Dayton Auto Truck Co., Dayton, Ohio:

Secured order from the state of New York for 7 Model K (3-ton capacity) Durable Dayton motor trucks against 21 competitors.

WISHART—Dayton Auto Truck Co,
New York City, February 25.

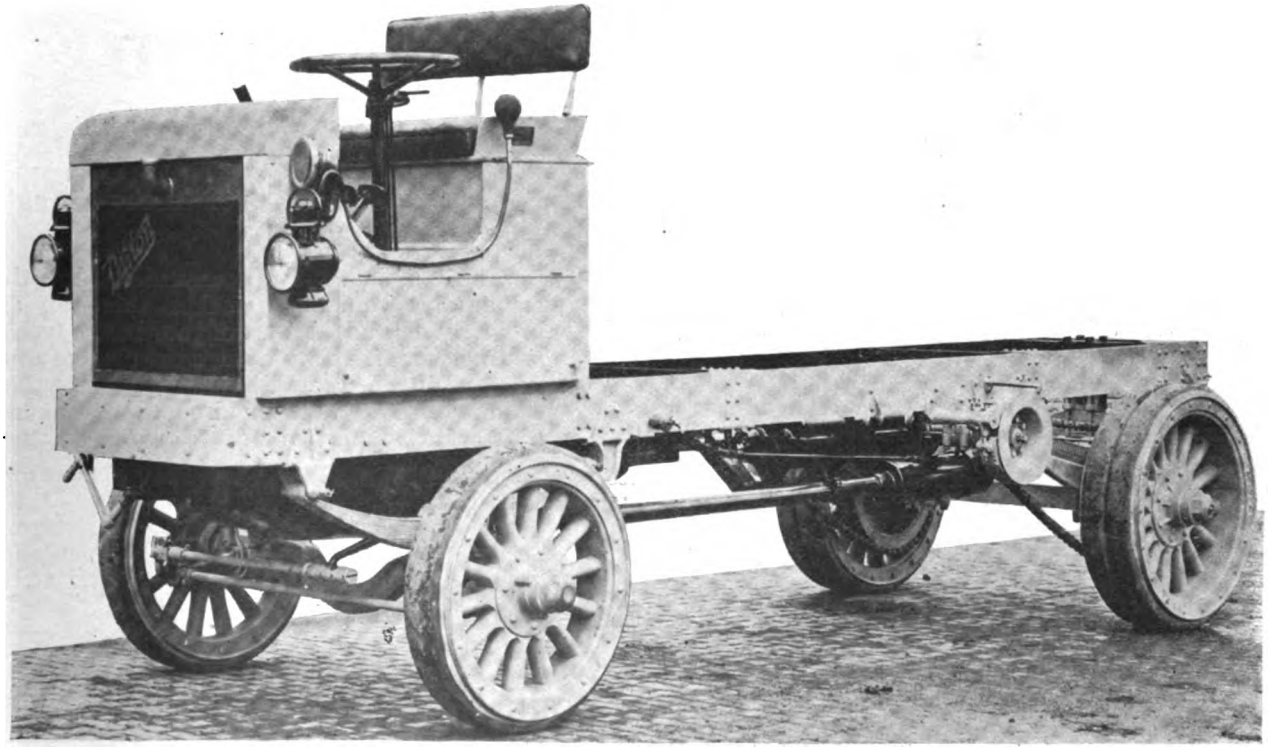
The seven machines above referred to are being applied in state hospital service at Albany, Brooklyn, Binghamton, Kings Park, Long Island and other points in New York.

The Motor Renting Co., of New York City, which concern leases machines to firms not desiring to own them, employs 12 **Durable Daytons** of 2-ton capacity in its fleet of 42 machines. The list of **Durable Dayton** owners is too long to print, but too important to be overlooked. Write for it.

Some Choice Territory open to discriminating dealers.

The Dayton Auto Truck Co.

Dayton, Ohio, U. S. A.



Durable Dayton Model M—Capacity 5 Tons

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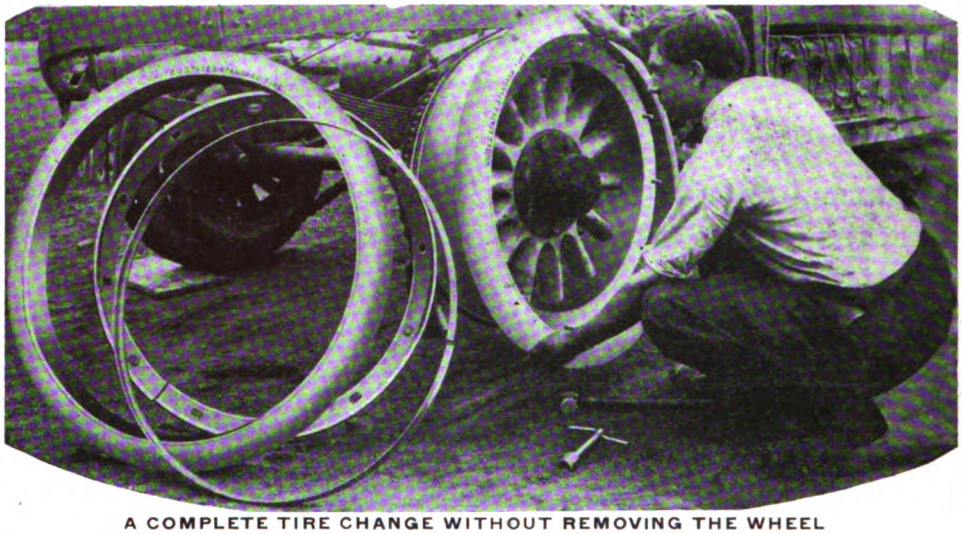
MORE PROFITS from your motor delivery system

is simply a question of getting more service and better service from your motor trucks—of eliminating such needless delays and losses as those occasioned by tire troubles.



A COMPLETE TIRE CHANGE WITHOUT REMOVING THE WHEEL

Business men and motor truck experts everywhere are rapidly coming to realize the tremendous advantages to be gained by equipping their trucks with

THE NEW UNITED STATES STANDARD MOTOR TRUCK TIRE (Demountable)

and thereby positively insuring them against the necessity of ever losing a single hour's service on account of tire troubles and tire replacements.

They are learning that this long-lived tire, with its 10,000 mile guarantee, has not only made tire replacements few and far between, but has made them a matter of a few moments' work on the part of the driver instead of a few days' layup for the truck.

The simplicity and convenience of the demountable equipment makes this tire an absolutely dependable part of your motor truck, enabling your driver to make a tire change anywhere in fifteen minutes' time; a change that would heretofore have required the laying up of your truck from two days to two weeks.

With the services of each truck you operate, worth from $15 to $25 per day, the *money-saving* possibilities of the new UNITED STATES TIRE are obvious.

If you have not yet seen our illustrated booklet, "A Revolution in Tires for American Motor Trucks," you ought to write for a copy today.

United States Tire Company

NEW YORK

BRANCHES, AGENCIES OR DEALERS EVERYWHERE

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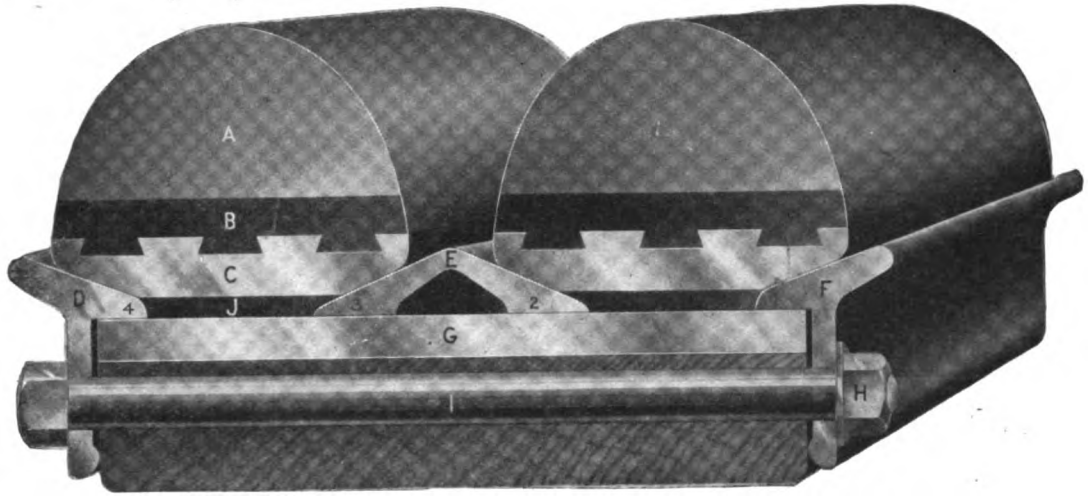
TRUCK MAKERS AND DEALERS
The tires on your trucks will help or hinder their sale

There is no denying the influence that tires have on the sale of motor trucks. Whether you are figuring on the sale of a "fleet" or a single machine, you are bound to encounter the questions of tire mileage and tire up-keep cost.



ROSS SECTION VIEW OF UNITED STATES STANDARD TWIN TIRE AND DEMOUNTABLE RIM

A—Tough Rubber Tread
B—Hard Rubber Base
C—Metal Base
D—Inside Flange Wedge Ring
E—Center Wedge Ring
F—Outside Flange Wedge Ring

The man of big business who uses dozens of trucks demands the *lowest tire cost per mile*, and installs an accurate system of tire cost accounting to see that he gets what he wants.

Tire cost to the man trying out his first installation is second only to his demand for continuous truck service. To tie up his delivery system for days at a time when a tire needs repairs or replacing, may cause him to decide against the use of motor trucks for his delivery work.

Both these tire problems are solved by

THE NEW
UNITED STATES STANDARD MOTOR TRUCK TIRE (Demountable)

This tire has an absolute guarantee for 10,000 miles —a lower guaranteed tire cost per mile than any other tire maker offers today

Equally important is the fact that this tire can be changed anywhere by the driver himself in fifteen minutes' time.

Can you imagine a more powerful argument in favor of your make of truck than to be able to absolutely assure your buyer that he will be guaranteed the lowest possible tire cost on his truck equipment (whether it be a single machine or a "fleet"), and that it will never be out of commission a single hour on account of tire replacements?

United States Tire Company
NEW YORK

BRANCHES, AGENCIES OR DEALERS EVERYWHERE

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HYATT ROLLER BEARINGS.

The most magnificent catalog it has ever been our pleasure to inspect is what the Hyatt Roller Bearing Co., of Detroit, Mich., popularly calls its "Plant Book." The modest title is "Something About Roller Bearings," and on the fly leaf is the further caption, "A Book of Information on the Production of the Hyatt Roller Bearing." And it certainly is.

As a work of art the new Hyatt catalog is not only unexcelled; it is unequaled, in our experience at least.

Turning over the pages, we notice first a picture of the great factory at Newark, N. J., but the later illustrations of department interiors give one a better idea of the wonderful organization of the Hyatt company. The reception room and general offices, general manager's office, accounting department, purchasing department, order department, sales manager's office and general office of the commercial sales division, the various departments in the Detroit offices, works manager's office, cost department, general engineering department, analytical laboratories, physical laboratories, experimental department, engine and boiler rooms, receiving and shipping departments, store rooms, the various machine, metallurgical and assembling shops, and finally the finished products—pictures and descriptions of all these and more greet the eye in logical sequence and leave upon one the indelible impression of a great factory, perfectly and harmoniously organized, and designed for turning out the best of work in the most economical and expeditious manner. Any one interested in the use of roller bearings should certainly possess a copy of this businesslike and artistic Hyatt catalog.

STURDY DESIGNS ARE BEST.

"Your trucks weigh too much!"

"Your axles and equipments are too big and heavy!"

"Motor wagon manufacturers and component parts makers who stood for strong, sturdy, safe construction had these outworn objections hurled at them a few years ago."

"'Excessive weight' was the shibboleth which scared away many prospective purchasers."

"Pleasure car practice prevailed to a considerable extent in designing motor wagons and caught the unwary who couldn't differentiate, in external appearance at least, between a touring car and a 2-ton truck. In their mind's eye they pictured a power drawn vehicle designed for heavy duty, as looking like a stoutly built roadster."

"You wouldn't expect a Kentucky thoroughbred to pull a 3-ton load," observes E. W. Lewis, secretary and treasurer of the Timken-Detroit Axle company. "You need a heavy draft horse for trucking service. So it is in the motor truck industry. Power wagons should 'look the part.'"

"In designing and building heavy duty trucks, pleasure car practice doesn't appeal to me at all," insists Mr. Lewis. "In making mental note of the marked advances which have been made in motor car construction, stimulated to a great extent by the Coliseum show, the two things which impress me most are, first, the gradual adoption of fixed types and sizes, and second, that in gazing at a sturdy strong commercial truck you really know what you are looking at.

"Mere bigness doesn't mean anything. But size and strength of materials, backed by mechanical excellence and first class construction, are the marks designers and builders are shooting at in the substructure of the heavy duty power drawn vehicle.

"In selecting the surviving types and sizes to carry the load, to stand the wear and tear of every day service, to withstand the vibration of city streets, to stand up under the strain of constant starting and stopping, to have the proper pulling capacity, to embody the corner stones of motor truck construction, strength, simplicity, durability, to keep down the cost of upkeep and repairs, to have long life, to foil the foolish driver who overloads and unduly taxes the tonnage capacity, to assure the owner complete satisfaction, the swing of the pendulum is towards more weight, not less.

"More and more is the American business man, the buyer, appreciating the fact that sturdy and strong construction—sheer weight—scientifically distributed, is one of the great essentials in motor wagon construction. In choosing the truck which will do its duty, weight, workmanship and material are the most important considerations.

"Two or three years ago it was pretty hard to convince a man that to carry a paying load of 6000 pounds or 3 tons, the empty truck itself should weigh fully 3 tons or 6000 pounds.

"Now the business man is seeking the light. He is being educated to the importance of having big, husky parts, well designed with lots of weight, well distributed, in his motor wagon, so it will stand up to the grueling test of actual service all day long, 6 days a week, 52 weeks a year.

"Parts-makers have heard the cry: 'Your axles and equipments are too big and too heavy,' so often that it was quite refreshing, the other day, to have the designer of one of the most successful power wagons walk into our office and say: 'There is just one thing we would do if we were building that big rear equipment you are furnishing us, and that is we would make it still heavier.'

"Strength a-plenty has always been one of the leading features of Timken-Detroit construction. In the early days we were criticised severely for it, but time and cumulative experience have proven the wisdom of our policy. To-day, the universal tendency is towards stronger and sturdier construction. Our vindication has been complete.

"In America, motor wagon progress has been amazing. Experiments with pleasure car chasses brought forth the first models. As modifications were made their parts were strengthened until they stood up under the load.

"In Europe, particularly in England, development has been along different lines. Their starting point was not the pleasure car, but the heavy traction engine. Having hauled heavy loads commercially for many years, quite naturally they did their experimenting and developing from steam tractor practice.

"So abroad there has been a gradual building up until both they and we are reaching the happy medium and agreeing on the best practice."

LIPPARD-STEWART AGENCIES.

Among the Lippard-Stewart agencies that have been closed this year up to date are the following: Neely & Ensor, Baltimore, Md. (also handle Alco machines); Edwin H. Jennings Co., Bridgeport, Conn. (also handles the Stevens-Duryea machines); Michigan Motor Co., Portland, Ore. (for the state of Oregon); Whitten Motor Vehicle Co., Providence, R. I. (also handles the Abbott-Detroit machines); Sterling Place Garage, Brooklyn, N. Y.; Newark Power Wagon Co., Newark, N. J.; Ryder Motor Co., Poughkeepsie, N. Y.; W. H. Heinzerling, Sedro Wooley, Wash.; Turk & Brown, Rochester, N. Y.; Dean DeWitt, Columbus, Ohio.

NEW MOTOR BUS SERVICE.

Mayor Joseph Versailles, of East Montreal, has instituted motor bus service between his municipality and Montreal proper. He had an Alco chassis equipped with a body that accommodates 30 passengers and a considerable amount of baggage.

The bus used for this service has proven an innovation. It makes trips daily on schedule time.

GOOD TESTIMONIAL.

After 15 months' service of a 5-ton Sampson truck, the Mosler Safe Company, of New York, has ordered a second Sampson, insisting that absolutely no changes be made in the truck. Both vehicles are equipped with windlasses, operated by the power of the motor, enabling the crews to lift the heaviest safes in much less time than is required by hand power.

Motor buses will be used to convey employes of the United Zinc and Chemical Works, Springfield, Ill., between the factory and the terminus of the local street car company.

The Syracuse (N. Y.) "Herald" has installed in its service a 25-hp. Mack power wagon of 3 tons' capacity.

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PELLETIER'S NEW WORK.

In addition to his other duties as advertising director of the Studebaker Corporation and advertising manager of the Flanders Manufacturing Company, E. LeRoy Pelletier has agreed to write the advertising of the Universal Motor Truck Company.

In such esteem does Henry Uehlein, who is the chief financial backer of the Universal concern, hold the reputation of Pelletier and his standing with the ad public, that Mr. Uehlein stipulated every piece of copy be signed by this well known advertising man. When it is remembered that Mr. Uehlein is also president of the Schlitz Brewing Company, and, as such, is an authority on what constitutes good advertising, it will be seen that this is no small compliment to Mr. Pelletier.

AN UP-TO-DATE CONTRACTOR.

"The keen business man isn't long in utilizing modern utilities in as many ways as his ingenuity will permit," says Gleeson Murphy, vice president of General Motors Truck Company. "Here is a case of a Natick, Mass., contractor, the owner of a 3½-ton motor wagon, who uses it as a 'hurry-up way' of getting on a new job. Instead of waiting for teams to move his tools and other building material, and sending his men by train, he simply loads his entire outfit on the machine and away he goes. Recently he moved his equipment and men 24 miles and was on a new job in three hours. On another occasion he finished some work at 2 o'clock, loaded his men and tools, shifted to another city 75 miles away, arriving there that same night, and began on the new job at 7 o'clock the following morning."

GOOD FEAT BY COMMER.

A Commer 4½ truck, loaded with 5½ tons of sand in bags, recently made the run of 108 miles from the Kingston factory to the Wyckoff, Church & Partridge headquarters in New York City at the rate of over 10 miles an hour. The chassis was wanted for immediate delivery in New York, and this endurance run over rough and icy roads was undertaken not only as a severe test but also to economize time on railroad handling and delivery.

MACK'S MESSENGER.

This is the name of a bright little house organ gotten up monthly by J. M. Mack, vice-president of the International Motor Company, 30 Church street, New York, as a personal message to the owners and drivers of Mack and Saurer power wagons. The general educational features of this publication commend it to the attention of all interested in motor wagons.

Rural Mail Carrier O. W. Bosman, Urbana, Ohio, is delivering mail by motorcycle.

SOME HELPFUL POINTERS.

"When one thinks of the conversions which must be made of varying elements in business life to change delivery of merchandise by horse drawn vehicles to the motor propelled commercial car delivery, it is surprising to consider how rapid the transition has been," said F. K. Parke, general manager of the Universal Motor Truck Company.

"If it were necessary only to convince the head of a large mercantile company of the advantages to be gained by delivering his goods through the new medium, the matter would be comparatively easy, for every man of large business affairs knows that a saving of time means a proportionate saving of money. The fact remains, however, that before a business man purchases a motor truck he looks for information from his shipping clerk, driver, barn man and a dozen others who have something or other to do with the disposition of goods after they are sold.

"It is a well known fact that the driver is a hard man to convince of the advantages of power wagons over horses. His driver ordinarily is a man of unusual physical prowess, proud of the fact that he can toss a barrel of sugar or a sack of flour from the ground to the wagon without assistance, and he never overlooks a chance to demonstrate that he is capable of meeting any emergency requiring physical strength, even though it is a test of fisticuffs with another driver who desires to beat him to the freight house. Quite frequently the driver wakes in the morning with a grouch, which is taken out through the medium of beating his horses. When such a driver is given a motor to handle he finds less satisfaction in venting his spite, but he is sometimes gratified that the motor cannot complain even through the medium of kicking, frequently to the detriment of gears and other mechanism, without knowledge of the man who pays the bills.

"One might think it would be better to engage a professional chauffeur to do the driving. The fact remains that driving is only a small part of the transportation. The knowledge of the expert freight driver and his ability to get goods from the freight or warehouse, and his familiarity with the difficulties of getting through congested downtown districts is of more importance than the mere driving of a vehicle.

"It may be readily understood, however, that the manufacturer of a truck who makes his vehicle approach the point known as 'foolproof' has an immense advantage over the truck maker who looks only to the artistic development of a motor such as might be considered the acme of perfection in a pleasure car."

San Bernardino, Cal., has just acquired its first motor hearse.

The Holy Family hospital, Brooklyn, N. Y., has a motor ambulance.

ANNIVERSARY MARKS RECORD.

Certain industries, due probably to some local conditions, have managed to make themselves peculiar to some particular part of the country. Akron, Ohio, for instance, is recognized as the rubber manufacturing center of the world. Detroit is the universal hub of the automobile industry. The shoe industry confines itself almost entirely to Boston and the New England states; flour to Minneapolis, and so on with other industries throughout the country.

Two out of every three automobiles in the country are equipped with Akron-made tires. Rubber factories have grown like mushrooms and two thirds of the 69,063 population are dependent upon the rubber industry. Everything in rubber is made in the city, from overshoes to the monster dirigible balloon "Akron," which is scheduled to take Vaniman and his crew across the Atlantic. Verily, the advance of Akron in the world of rubber has been phenomenal.

The Goodyear Tire & Rubber Company, one of the most aggressive and progressive of the Akron concerns, manufacturers of the famous "No-Rim-Cut Tire," this month celebrates an anniversary. The company has been in existence 13 years and has reached the million mark. Since its formation one million of its tires have been placed on the market.

The development of the company has been wonderful, and is a striking illustration of what modern American business methods will accomplish.

In 1907 the Goodyear Company made only 28,685 tires. That year started a new era of development in its history. The output has been doubled each year until, in 1911, 409,521 pneumatic automobile tires were manufactured. The present year marks another epoch in its history. Although the company's output has reached a million tires, B. W. Litchfield, factory manager, says it will be necessary, in order to meet this year's increased demands, to turn out 1,000,000 tires during 1912.

"There is not the slightest doubt," commented Mr. Litchfield, "that the 'No-Rim-Cut Tire' is the coming tire." Mr. Litchfield further supplemented his statement by disclosing the fact that every fourth automobile tire produced in this country is manufactured by the Goodyear Tire & Rubber Company, and that three tires a minute for 24 hours every day are turned out at the plant.

G. L. Summey, chief engineer of the Chase Rolling Mills Company, of Waterbury, Conn., spent $7,000 and three years' time investigating motor trucks. He finally selected the Sampson.

Power wagons for garbage collection will be tried out by the city of Los Angeles, Cal. One 3 ton and one 5 ton machine will be rented for this purpose.

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DECLINE OF HORSE IN N. Y.

During the first snowstorm of the year, which severely handicapped traffic and delayed deliveries in New York early in December, a count was kept in the Alco offices at Broadway and Sixty-second street of all the passing vehicles.

In one hour the observers counted 63 motor trucks as against 29 two-horse teams and 1 four-horse team. The statistics were compiled at the most unfavorable part of the day for motor wagons—from 11:30 a. m. to 12:30 p. m., after the machines had beaten a path for the horse drawn vehicles.

Horses tugging, straining, and slipping under load were frequently observed. Without exception the horses that successfully pulled the loaded wagons could make an average speed of only 1½ miles an hour. The motor wagons traveled along at their usual rate.

"These figures tell their own story," said Mr. Houpt. "They show how many horses were tied up and out of commission, unable to make deliveries on account of the snow and ice. They show also how the horses are giving way to the motor truck in the service of progressive business concerns.

"It was almost like a holiday in our garage. Not once was one of our trucks delayed. There were no hurry-up calls. Big users like the American Express Company and Gimbel Brothers found their trucks giving perfect service, with the snow no barrier."

GRAMM IN RUSSIA.

H. A. Goddard, who recently returned from the land of the czars, tells of the success the Gramm is having in that faraway country. "In Russia," said Mr. Goddard, "the government officials were asked to put an American made truck to the severest test possible. They were asked to smash it to pieces, if they could, the stipulation being made that if the power wagon produced by Uncle Sam did not make good the vehicle would be presented to them.

"The test which followed was more severe than had been anticipated, but on the showing made the Russian government purchased the first American trucks ever operated by it."

8,000 MILES—TIRES GOOD YET.

A machine in the service of the street department of Los Angeles has run over 8,000 miles in 8 months on one set of tires, and they are still good for much more active service. The tires were made by the Goodyear Tire & Rubber Co., Akron, Ohio.

OLD VETERANS STILL RUNNING.

The Saurer and Mack power wagons are claimed by the makers, the International Motor Company, to be the oldest machines, in point of service, of any on the market. They claim that the first Saurer truck manufactured at Arbon, Switzerland, by Adolph Saurer, as an experimental machine for transportating embroidery machines over the Alps in 1894, is still in active service at the Arbon plant at the present time. The Saurer slogan—"In more than twelve years no Saurer has ever worn out"—seems to have been more than justified in the case of the first born product of Saurer make. A motor wagon that can endure all of the knocks and strain of continuous service for seventeen years must embody a finesse of design and a quality of materials that, so far as the science of metallurgy can make them, are invulnerable. It would seem that "crystallization," an inherent property of all metals, regardless of their physical and chemical characteristics, would have, in a period of seventeen years, caused the first born Saurer truck to have practically fallen to pieces from the changes in the molecular structure of metals subject to the long continued hammer effect of the loads. However, the original Saurer is claimed by the International Motor Company to be in a condition which fits it for pulling loads readily up the steep grades of the Swiss mountain roads just as when it was first manufactured. Such longevity of the motor truck proves that, in the case of the Saurer at least, the conventional depreciation factor of 15 per cent is very much exaggerated.

The International Motor Company also claims that the Mack truck built in Brooklyn, 1900, at the original plant of Mack Bros. Motor Car Co.—a sight-seeing bus constructed for Isaac Harris, Brooklyn, and used by him in Prospect Park—has passed through a number of users' hands and for seven or eight years continued its history as a passenger vehicle, in service in large cities of the East. About four years ago this original Mack bus was sold to a firm in Tucson, Arizona, and converted into a freight carrying vehicle. The machine is still in active commission. The history of this first Mack truck is also very satisfying evidence of the life of the Mack product which early adopted for its slogan—"The leading gasoline truck of America." The International Motor Company claims that any number of Mack trucks manufactured in the first few years of the present century can be seen in operation in New York City, Boston, Philadelphia, Baltimore and other large cities of the East.

The record of the first Mack and the first Saurer truck would seem to refute all accepted conventional factors of depreciation by the majority of motor truck owners.

RAPID LOADING FACILITIES.

Having solved the problem of quick, convenient transportation of freight by the use of motor trucks, many power wagon owners are now turning their attention to the matter of more rapid loading facilities.

"The most effective device yet perfected for this purpose is the power driven winch," says Chas. F. Barrett, advertising manager of the Knox Automobile Company. "On horse trucks a winch is not of much assistance, as the operation by hand is too slow and any arrangement using horse power is so clumsy as to be intolerable except in a few special instances. With the motor truck, however, the winch can be made of invaluable assistance in the loading of heavy freight on account of its ease of manipulation and the fact that it derives its power direct from the same motor which propels the vehicle.

"The Knox Automobile Company was one of the first companies to recognize the value of the power winch for general trucking purposes and developed a very simple but effective form which has been in successful use by many trucking concerns for several years. The winch is located at the rear end of the frame and is put into operation by the simple moving of a gear into mesh with a corresponding gear on the main propeller shaft. The rope from the winch passes over a pulley at the forward end of the body, so that it may be used to draw freight up to the extreme end of the loading platform.

"As an instance of the value of the winch may be mentioned its use in the loading and raising of safes, otherwise a laborious, difficult problem. Heavy machinery and furniture can also be handled with greatest ease and many other difficult tasks of the truckman made correspondingly simple."

A GOOD RECORD.

The Acme White Lead and Color Works, of Detroit, have had in operation a 5 ton General Motors truck, and since its installation have been keeping a strict account of its performance and operating cost. This particular machine took the place of two teams and two men, but for a month both were in operation in order to make the comparison.

Here are some of the interesting things brought out by the test: While the two teams were only able to carry 250 tons of material during the month, the motor wagon, during the same period, carried loads aggregating 780 tons, or better than three times the amount of the horse-drawn vehicles. The machine's superiority in this respect was easily proven. As to the territory covered—and this is one of the very important things—the teams negotiated 1,144 miles, against 1,430 miles covered by the power wagon. It will be seen from this that the machine was able to cover a third more territory than the teams. The biggest surprise, however, was in the matter of expense. It took $229.16 to maintain the two teams—pay wages of drivers and feed for the horses. The motor truck involved an expenditure of $152.10. This included wages of driver, gasoline and oil.

To summarize, it not only cost $77.06 less to maintain the motor wagon for the given month, but with it they were able to cover 286 more miles and carry 530 more tons of material.

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COMMER TRUCK ACTIVITY.

It is asserted by Mr. Wagner, sales manager of Commer trucks, that power wagon sales will rapidly increase as spring advances. A number of important orders for Commer trucks were recently taken from big and influential houses.

The Commercial Coal Company, of Brooklyn, has just bought a 5½-ton W. C. P. Commer. This is the third New York coal concern to adopt motor trucking in New York by the Commer method.

The New York Bottling Works have also ordered a 5½-ton W. C. P. Commer. Gray Brothers, bottlers, who cover 14 townships in Fairfield County and Westchester County, New York, adopted the Commer eight months ago, and enthusiastically praise the work of their machine to other inquirers in the same line of business. In a recent letter to the "Bottlers' Gazette," Gray Brothers said: "Some of our runs are over 30 miles there and back, which we cover in half a day, and go another route of 28 miles in the afternoon. We formerly covered these routes with horses but would rather go out of business than go back to the old way on these long runs. The bulk of the carbonated water business comes in the heat of summer when horses can't stand it."

The J. & M. Haffen Brewing Company is the fourth concern in New York City in their line of business to adopt the Commer truck, and has just ordered a 4½-ton W. C. P. Commer. The other three brewers have each given repeat orders. In the brewery trade prompt and sure deliveries are a most necessary essential. The heaviest hauling comes in the summer time when hundreds of horses are unable to stand the strain of heat and the extra exertion required of them.

During the past month the firm of R. F. Stevens, of Brooklyn, large handler of dairy products, purchased its first Commer truck. This was a 6½-ton English Commer chassis. The American 6½-ton truck has not yet gone through its trial runs. This chassis is a duplicate of the eight Commers bought by the well-known coal firm of H. L. Herbert & Co.

Among other recent sales are a 4½-ton truck to Wm. S. Van Clief, lumberman, Port Richmond, Staten Island; the John Simmons Company, piping and plumbers' supplies, 4½-ton; also a 4½-ton truck to the Martin Cantine Company, paper manufacturers, Saugerties, N. Y.

A deal was also concluded with the Adams Express Company, New York City branch, for its first 4½-ton W. C. P. Commer.

All the above sales were the result of the activities of the New York sales agents, the Transportation Sales Company.

Rapid strides have also been made in the outside Commer agency work.

The Heurich Brewing Company, of Washington, has acquired two Commers of 3½-ton capacity and one of 4½ tons.

Three Commers were recently shipped to the Dodge Motor Vehicle Company, the agents at Boston. This concern has lately established branch agency representation in Taunton and Fall River, Mass.

The Andrews Contracting Company, of Baltimore, has just bought a Commer.

In Los Angeles a deal was closed last month for local Commer representation on a first order for 12 machines.

Although the English Commer was placed on the market but a year ago, and the first model of the American-made chassis was shipped from Kingston, New York, but a few months ago, they have found their way into 17 lines of trade.

FORD QUANTITY DISCOUNT.

The Ford Motor Company has followed the lead of several other big concerns in giving discounts on big quantity orders. The announcement by the company is as follows:

"Orders for single cars from commercial houses will be filled only at the regular list prices in accordance with our catalog.

"Orders from commercial houses for several cars to be delivered and paid for at the same time, or orders for more than one car provided such orders are placed with and accepted by us and deliveries made during our fiscal year, viz.: from October 1, 1911, to September 30, 1912, will entitle the commercial purchaser to a discount from our list equivalent to the number of cars so ordered and taken, multiplied by the constant two-tenths of one per cent.

"Thus, on an order for ten Ford cars for commercial purposes, the price would be calculated by multiplying two-tenths of one per cent. by ten and using the amount so arrived at, namely, two per cent. as a discount from the total purchase list price of the ten cars. For example, if these ten cars were for Ford delivery wagons at $700 each, ten of them would cost $7,000 less the discount of two per cent. figured on the above basis, which would be a reduction of $140.

"If fifty cars were purchased on the same basis the discount would be ten per cent off the list, so on a total purchase of $35,000 the buyer would receive a discount of $3,500."

Pennsylvania Railroad officials at Pittsburgh, Pa., have ordered the gradual elimination of all the hand-propelled trucks now in use at Union Station and the substitution of electric storage battery trucks. Six of these latter are already in operation.

MANY NEW ALCO AGENTS.

Among the new Alco agents recently closed are the following: H. H. Dennis, Toledo, Ohio; T. A. Crow, Toronto, Can.; Franklin Auto and Supply Co., Milwaukee, Wis.; Park Auto Co., Erie, Pa.; Auto Sales Co., San Francisco, Cal.; Guy R. Champlain, Jacksonville, Fla.; Augustus E. Staley, Decatur, Ill.; William J. Mehring, Harrisburg, Pa.; H. W. Brown, Binghamton, N. Y.; Peden Iron and Steel Co., San Antonio and Houston, Texas; Levy-Kramer Automobile Co., Dallas, Texas.

MOTOR CONVEYANCE AGENCY.

The Motor Conveyance Company, Milwaukee, Wis., maker of B. O. E. motor wagons and gasoline railway cars, has closed an agency with the Steckel Motor Truck Company, 1414 Ridge avenue, Philadelphia, for eastern Pennsylvania and southern New Jersey.

The election of Frank P. Town and other new officers of the Duplex-Power Car Company was sustained in a decision handed down by Judge Clement Smith on March 1 last. The company, which at present is located in Charlotte, Mich., owns the patents in a 4-wheel-drive truck, and may possibly be taken over by the General Motors Company and induced to locate in Lansing, Mich.

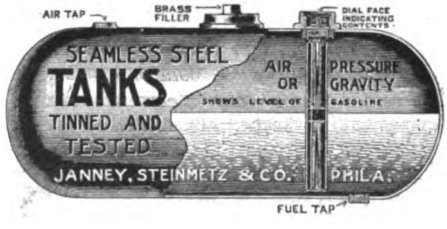
Pittsburgh recently asked bids on 6 motor hose and chemical wagons, 5 motor patrols, 1 fire engine tractor and 2 motor cars.

CLASSIFIED ADVERTISING.

WANTED—Foreman; also production manager for large automobile factory, must be thorough mechanic in automobile manufacture, possessing executive ability of highest order; want foreman for first and final assembly and machine departments. State age, experience, references, salary wanted. 218 State Life Building, Indianapolis, Ind.

FOR SALE—3½ Ton (used) Couple-Gear Battery Truck. Hycap Exide Battery. Mechanical and electrical condition good. Also rectifier. Price complete, $2,500 for quick sale. B. F. Avery & Sons, Louisville, Ky.

Motor Truck Tanks



Strong, Sturdy, Safe and Leakless

GASOLINE TANKS—ALL SIZES IN STOCK. Compressed Air Tanks—for Motor Starters. New Catalogue Now Ready. —WRITE US

Janney, Steinmetz, Philadelphia

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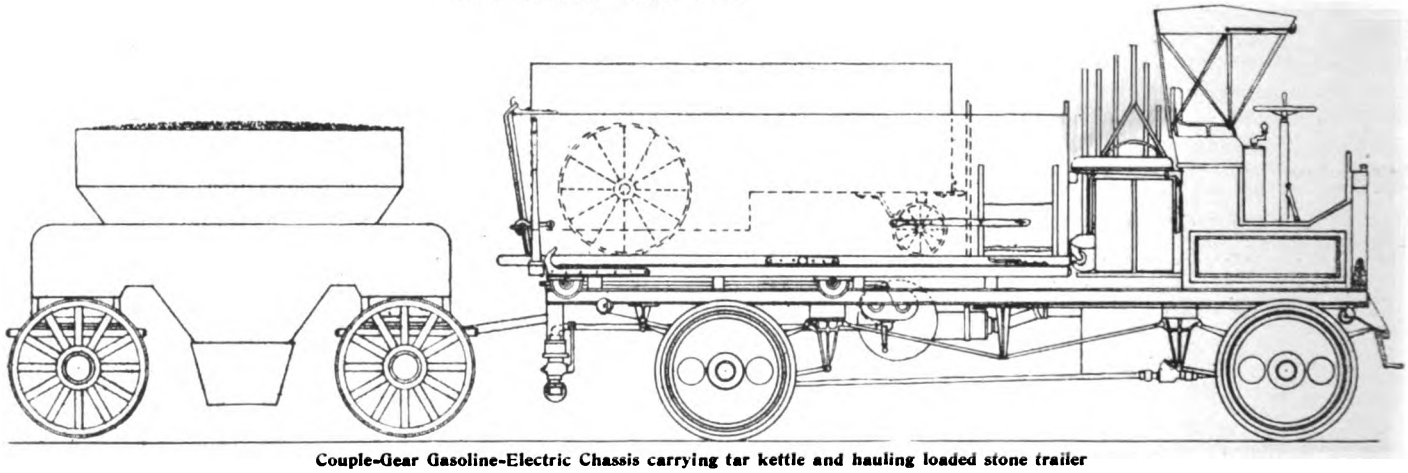
Millions of Dollars

Can Be Saved Every Year in the Making and Maintenance of Roads—Removal of Garbage and Snow—and Municipal Hauling of All Kinds, by Using

The Couple-Gear Gas-Electric Chassis

fitted with special attachments recommended by WILLIAM P. KENNEDY and indorsed by LOGAN WALLER PAGE, Director of the United States Office of Public Roads

Two highly interesting articles on this subject are to be found in this present issue; "*Motor Wagon for Road Repair*," by Logan Waller Page, on pp. 27-31, "*Snow Removal*," on pp. 39-42.



Couple-Gear Gasoline-Electric Chassis carrying tar kettle and hauling loaded stone trailer

SEND US YOUR PROBLEMS
and we will give you estimates and figures

Couple-Gear Freight-Wheel Co.

550 Buchanan St., GRAND RAPIDS, MICH.

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CLASSIFIED BUYERS' GUIDE

Prepared for the convenience of buyers of motor wagons, parts and equipment. All the concerns listed under the various headings advertise regularly in the "Power Wagon."

AUTOMATIC MACHINERY.
Cleveland Auto Machine Co., Cleveland, O.

AXLES.
Driggs-Seabury Ordnance Co., Sharon, Pa.
Sheldon Axle Co., Wilkes-Barre, Pa.
Timken-Detroit Axle Co., Detroit, Mich.
Torbensen Gear & Axle Co., Bloomfield, N. J.

BEARINGS (Ball).
Barthel, Daly & Miller, New York City, N. Y.
Bretz, J. S., Co., New York City.
New Departure Mfg. Co., Bristol, Conn.
R. I. V. Co., New York City, N. Y.

BEARINGS (Roller).
Bower Roller Bearing Co., Detroit, Mich.
Hyatt Roller Bearing Co., Detroit, Mich.
Timken Roller Bearing Co., Canton, Ohio.

BEARING BRONZE.
American Bronze Co., Berwyn, Pa.

BRAKE LINING.
Johns-Manville Co., New York City, N. Y.
Woven Steel Hose & Rubber Co., Trenton, N. J.

CARBURETORS.
Zenith Carburetor Co., Detroit, Mich.

CASTINGS.
Wehr Steel Co., Milwaukee, Wis.
Wetherill Finished Castings Co., Philadelphia, Pa.

CHAINS.
Baldwin Chain & Mfg. Co., Worcester, Mass.
Culver-Taylor Chain Works, Detroit, Mich.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Sarco Engineering Co., New York City, N. Y.
Whitney Mfg. Co., Hartford, Conn.

CLUTCHES.
Merchant & Evans Co., Philadelphia, Pa.
Otto Konigslow Mfg. Co., Cleveland, Ohio.

CONTROL LEVERS.
Otto Konigslow Mfg. Co., Cleveland, Ohio.

DIFFERENTIALS.
Cullman Wheel Co., Chicago, Ill.
Ross Gear & Tool Co., Lafayette, Ind.

DROP FORGINGS.
Park Drop Forge Co., Cleveland, O.
Western Drop Forge Co., Marion, Ind.
J. H. Williams Co., Brooklyn, N. Y.

ELECTRIC CURRENT.
Commonwealth Edison Co., Chicago, Ill.

ELECTRIC MOTORS.
Westinghouse Electric & Mfg. Co., Pittsburgh, Pa.

ELECTRIC WELDING.
Standard Welding Co., Cleveland, O.

ELECTRIC WAGONS AND TRUCKS.
Anderson Electric Car Co., Detroit, Mich.
Baker Motor Vehicle Co., Cleveland, Ohio.
Couple Gear Freight Wheel Co., Grand Rapids, Mich.
General Motors Truck Co., Detroit, Mich.
General Vehicle Co., Long Island City, N. Y.
Joliet Auto Truck Co., Joliet, Ill.

FOOT PEDALS.
Otto Konigslow Mfg. Co., Cleveland, Ohio.

GASOLINE ENGINES.
Continental Motor Mfg. Co., Muskegon, Mich.
Hazard Motor Mfg. Co., Rochester, N. Y.
Syracuse Gear Co., Syracuse, N. Y.
Western Motor Co., Marion, Ind.
Wisconsin Motor Mfg. Co., Milwaukee, Wis.

GAS-ELECTRIC WAGONS AND TRUCKS.
Couple Gear Freight Wheel Co., Grand Rapids, Mich.

GASOLINE STORAGE OUTFITS.
Air Tight Steel Tank Co., Pittsburg, Pa.

GASOLINE WAGONS AND TRUCKS.
Adams Bros. Co., Findlay, Ohio.
Alden Sampson Mfg. Co., Detroit, Mich.
American Locomotive Co., New York City.
Avery Company, Peoria, Ill.
Bessemer Motor Truck Co., Grove City, Pa.
Bowling Green Motor Car Co., Bowling Green, Ohio.
Buckeye Mfg. Co., Anderson, Ind.
Chase Motor Truck Co., Syracuse, N. Y.
Clark Delivery Car Co., Chicago, Ill.
Commerce Motor Car Co., Detroit, Mich.
Dart Mfg. Co., Waterloo, Ia.
Dayton Auto Truck Co., Dayton, Ohio.
Federal Motor Truck Co., Detroit, Mich.
Ford Motor Co., Detroit, Mich.
General Motors Truck Co., Detroit, Mich.
Gramm Motor Truck Co., Lima, Ohio.
Grand Rapids Motor Truck Co., Grand Rapids, Mich.
Harwood-Barley Mfg. Co., Marion, Ind.
Henry Lee Power Co., Chicago.
Ideal Auto Co., Fort Wayne, Ind.
International Harvester Co., Chicago, Ill.
International Motor Co., New York City, N. Y.
Jarvis Huntington Automobile Co., Huntington, W. Va.
Kissel Motor Car Co., Hartford, Wis.
Knickerbocker Motor Truck Mfg. Co., New York City, N. Y.
Knox Automobile Co., Springfield, Mass.
Lauth-Juergens Motor Car Co., Fremont, O.
Lincoln Motor Car Co., Chicago, Ill.
Lippard-Stewart Motor Car Co., Buffalo.
W. H. McIntyre Co., Auburn, Ind.
Mercury Mfg. Co., Chicago, Ill.
Motor Wagon Co. of Detroit, Detroit, Mich.
National Motor Truck Co., Bay City, Mich.
New Haven Truck & Auto Works, New Haven, Conn.
Packard Motor Car Co., Detroit, Mich.
Peerless Motor Car Co., Cleveland, Ohio.
Pierce Arrow Motor Car Co., Buffalo, N. Y.
Piggins Motor Car Co., Racine, Wis.
Seitz Auto & Transmission Co., Detroit, Mich.
Speedwell Motor Car Co., Dayton, Ohio.
Universal Machinery Co., Milwaukee, Wis.
Velie Motor Vehicle Co., Moline, Ill.
Victor Motor Truck Co., Buffalo, N. Y.
White Co., Cleveland, Ohio.
Willys-Garford Sales Co., Toledo, Ohio.

JACKSHAFTS.
New York Gear Works, New York City, N. Y.
Sheldon Axle Co., Wilkesbarre, Pa.

LAMPS.
Castle Lamp Co., Amesbury, Mass.

LOCK WASHERS.
Positive Lock Washer Co., Newark, N. J.

LUBRICANTS.
Jos. Dixon Crucible Co., Jersey City, N. J.
Standard Oil Co., New York City, N. Y.

LUBRICATORS.
Detroit Lubricator Co., Detroit, Mich.

MAGNETOS.
Bosch Magneto Co., New York City, N. Y.
J. S. Bretz Co., New York City, N. Y.
Remy Electric Co., Anderson, Ind
C. F. Splitdorf, New York City, N. Y.

NON-SKID DEVICES.
Atlas Chain Co., Brooklyn, N. Y.

PRESSED STEEL FRAMES.
Driggs Seabury Ordnance Corp., Sharon, Pa.
Hydraulic Pressed Steel Co., Cleveland, O.
A. O. Smith Co., Milwaukee, Wis.

RADIATORS.
Briscoe Mfg. Co., Detroit, Mich.
Harrison Radiator Co., Lockport, N. Y.
W. J. Kells Mfg. Co., New York City, N. Y.
Livingston Radiator Co., New York City.

RECORDING INSTRUMENTS.
Veeder Mfg. Co., Hartford, Conn.

SCREW MACHINE PARTS.
National Cycle Mfg. Co., Bay City, Mich.

SEAMLESS STEEL TUBING.
Standard Welding Co., Cleveland, Ohio.

SIGNAL HORNS.
Automobile Supply Mfg. Co., Brooklyn, N. Y.

SPARK PLUGS.
Emil Grossman Co., New York City, N. Y.

SPRINGS.
Perfection Spring Co., Cleveland, Ohio.
Sheldon Axle Co., Wilkesbarre, Pa.
Spring Perch Co., Bridgeport, Conn.
Tuthill Spring Co., Chicago.

SPROCKETS.
Cullman Wheel Co., Chicago.

STARTING CRANKS.
Otto Konigslow Mfg. Co., Cleveland, Ohio.

STEERING GEARS.
Baldwin Chain & Mfg. Co., Worcester, Mass.
Lavigne Gear Co., Detroit, Mich.
Muncie Gear Co., Muncie, Ind.
Ross Gear & Tool Co., Lafayette, Ind.

STEEL TANKS.
Air-Tight Steel Tank Co., Pittsburg, Pa.
Janney-Steinmetz Co., Philadelphia, Pa.
Western Drop Forge Co., Marion, Ind.

STORAGE BATTERIES.
Edison Storage Battery Co., Orange, N. J.
Gould Storage Battery Co., New York City.

TIRES (Pneumatic).
Diamond Rubber Co., Akron, O.
Firestone Tire & Rubber Co., Akron, O.
B. F. Goodrich Co., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Kelly Racine Rubber Co., Racine, Wis.
Swinehart Tire & Rubber Co., Akron, O
U. S. Tire Co., New York City, N. Y.

TIRES (Solid).
Diamond Rubber Co., Akron, O.
Firestone Tire & Rubber Co., Akron, O.
Jas. L. Gibney & Bro., Philadelphia, Pa.
Diagonal Block Tire Co., Urbana, Ohio.
B. F. Goodrich Co., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Kelly-Springfield Tire Co., Akron, Ohio.
Kelly Racine Rubber Co., Racine, Wis.
Motz Tire & Rubber Co., Akron, O.
Polack Tyre Co., New York City, N. Y.
Republic Rubber Co., Youngstown, Ohio.
Swinehart Tire & Rubber Co., Akron, O.
U. S. Tire Co., New York City, N. Y.

TRANSMISSIONS.
Covert Motor Vehicle Co., Detroit, Mich.
Driggs Seabury Ordnance Corp., Sharon, Pa.
Hazard Motor Mfg. Co., Rochester, N. Y.
Muncie Gear Co., Muncie, Ind.
New York Gear Works, Brooklyn, N. Y.
Syracuse Gear Co., Syracuse, N. Y.

UNIT POWER PLANTS.
Hazard Motor Mfg. Co., Rochester, N. Y.

UNIVERSAL JOINTS.
Blood Bros. Machine Co., Kalamazoo, Mich.
Kinsler-Bennett Co., Hartford, Conn.
Spicer Mfg. Co., Plainfield, N. J.

WHEELS.
Hayes Wheel Co., Jackson, Mich.
Schwartz Wheel Co., Philadelphia, Pa.

WHEEL MAKING MACHINERY.
Defiance Machine Works, Defiance, O.

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Mileage-Economy-Efficiency

Motor Truck owners have long felt the need of a tire that will give an increased mileage, that can be easily applied and quickly and cheaply repaired in case of accident.

The Diagonal Block Tire

has solved the problem. Equipped with this tire your truck will not be laid up for hours and possibly days because of tire troubles. Unnecessary to send your wheel to the service station to have a new tire applied. All that is needed is a wrench, and a change can be made in less than ten minutes. A NEW BLOCK MAKES A NEW TIRE.

Our Guarantee—25% more mileage than any other make.

Agents wanted everywhere. Write for our booklet **"The Diagonal Way."**

THE DIAGONAL BLOCK TIRE CO., Urbana, Ohio

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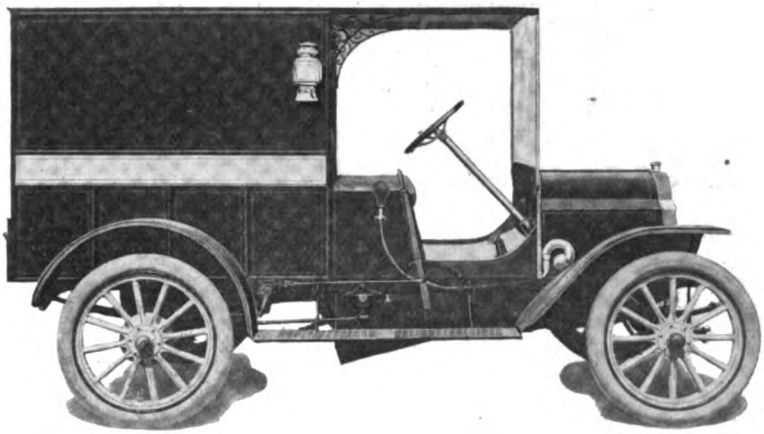
Here Is the 1912 Sensation of the Motor World



Panel Body; Four Cylinder, 20 H. P. Motor; Bosch High-Tension Magneto; Pneumatic Tires, 32x3½ Inches—Price Complete, $850.00. Solid 2½ Inch Truck Tires—Price Complete, $800.00.

COMMERCE CAR

Designed for the delivery of 1,000 pound loads at *minimum operating cost* and *low initial investment*

Bad roads and steep hills have no terrors for the "Commerce"

WE HAVE SOME CHOICE TERRITORY LEFT FOR GOOD, ACTIVE DEALERS

See the COMMERCE at Boston Show, March 13-20

Write for Catalog

The Commerce Motor Car Company

General Office: 634-640 Penobscot Bldg. - Detroit, Michigan

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Right now your truck needs non-skid, long-wearing, quick-attachable

Swinehart

CELLULAR TRUCK TIRES

For the sake of the safety and economy, you should be using Swinehart Cellular Tires on your truck.

They effectually prevent skidding under all conditions—without the aid of chains or other devices.

Service tests have shown that they may be expected to return 12,000 to 15,000 miles, instead of the usual 5,000 to 8,000 of the ordinary type of ordinary truck tire.

Both of these features are remarkable.

Both are due to the perforations in the tread.

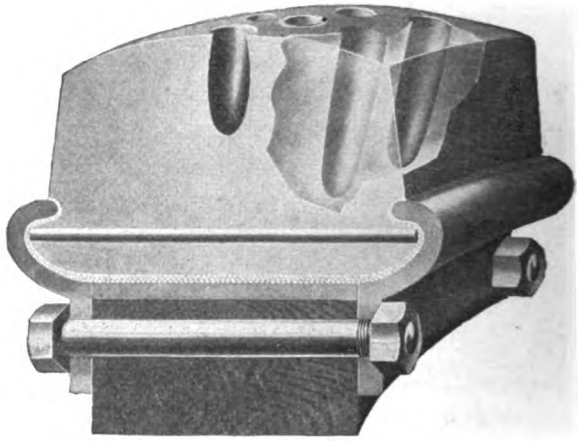
These perforations do three things which make the tire non-skidding and give it its extraordinarylife.

First, they grip the road with the force and the tenacity of a vacuum. Their grip is more firm than that of chains, and they save buying new chains every week or so.

Second, they provide space for the compression or flow of the rubber as the wheel revolves. They make the tire more resilient than any solid tire can possibly be.

Third, they serve as radiators, carrying away internal heat and keeping the tire cool at all times.

They are permanent, too. They are deep—extending nearly to the fastening device—so that the non-skid effect is retained until the tire is worn out.



Sectional phantom view of the Swinehart Cellular Tire. Note the depth of the perforations; the absence of longitudinal wires; the quick-attachable flange rims —all good features peculiar to Swinehart Tires.

On top of all this—the tires fasten with the famous Swinehart quick-attachable flange rim, by which 30 minute changes are made possible.

There you have, in one tire, every essential that makes for economy, long service and safety.

And back of it all, a national reputation that is literally putting Swinehart on the best trucks and the most.

You can't ignore the weight of solid facts like these.

You can't ignore Swinehart Cellular Tires if you are looking for maximum economy and efficiency.

Boston, March 2nd to 9th, 13th to 20th, Space 523 and 524.

The Swinehart Tire & Rubber Company

11 North Street, Akron, Ohio

Please mention the "Power Wagon" when writing to advertisers.

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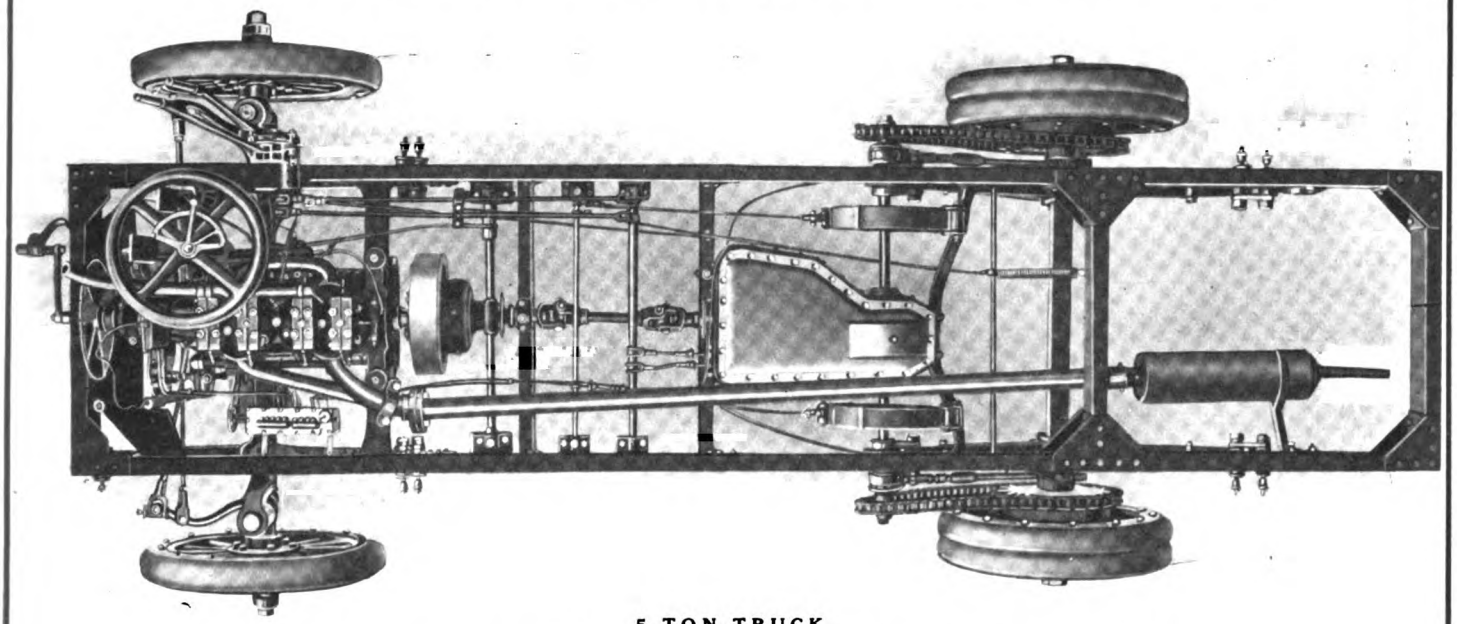
Jarvis-Huntington Motor Trucks

Not alone up-to-date,
but actually ahead of date

2 Ton Capacity $2750.00 **3 Ton Capacity $3500.00** **5 Ton Capacity $4400.00**



5 TON TRUCK

The Strongest and Most Compact Truck on the Market.

Jarvis-Huntington Exclusive Features:

I. **Motor:**—After three years of testing out, we offer the most economical and sturdy power plant in the market. Bore 4" x Stroke 6". 4 Cylinders cast separately. 4 Cycle. Valves in the head with overhead cams. Fitted with self starter.

II. **Clutch:**—Hele-Shaw, the best there is.

III. Jarvis-Huntington selective transmission. Chrome-vanadium gears, specially toughened.

IV. A special brake system that positively will stop the truck within its own length even at maximum speed.

V. Inspection of raw material and of finished parts carried to extreme.

VI. A guarantee of 10,000 miles service—no frills about it.

VII. **Complete equipment:**—Electric light, electric horn, tools, and a liberal supply of spare parts.

VIII. Above all—a square deal to agents and users.

We want the co-operation of some live dealers.

We have an extremely attractive agency proposition.

NOW is the time to write to

Jarvis-Huntington Automobile Co., Huntington, W.Va.

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The Tire that is Best

FOR A

Heavy Truck is the Best for Any Truck

Heat is the greatest factor in the destruction of tires.
Smooth tires generate and hold heat through frictional drag,—
And they also destroy themselves through the "push and pull" action that drives a "wave" of rubber ahead of the contact point.

The Kelly-Springfield Sectional Tire

Constructed in contact sections prevents heat and drag,—
Because each section works for an instant only—then rests until its turn comes again.
Each block is separate—independent—no stretching or heating.
Result—Tire economy running into hundreds of dollars annually.
Initial Cost—About the same as that of the ordinary tire.
Repair Cost—Reduced to a minimum.
You can put a new block on the tire as needed.

Write for details

KELLY-SPRINGFIELD TIRE CO.

NEW YORK, N. Y., and AKRON, O.

BRANCH OFFICES—New York, Chicago, Philadelphia, Boston, St. Louis, Detroit, Cincinnati, San Francisco, Los Angeles, Cleveland, Atlanta, Akron, Ohio, Buffalo.

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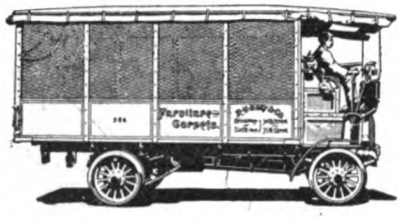
Pabst Brewing Co — Mack

National Lead Co — Saurer



R H Macy & Co — Mack

Over 1900 Mack Trucks are in service in this country.
Over 2000 Saurer Trucks are in daily use in Europe and America.

Proved by 12 years of real service **Mack *and* Saurer** Proved by 17 years of real service

"Leading gasoline trucks of the world"

The Right Man's Chance

We want the right man to represent these trucks in every town or city of 10,000 or more people. Such places offer great opportunities to *the* right man with the right trucks. Their great need is good commercial transportation facilities.

Ours are the only trucks that have been in actual every-day use 12 to 17 years — long enough to have proved to every business man's satisfaction their investment value. The only ones that have justified their purchase price by their records for efficiency, economy and long life. No other truck has a record that even affords a basis of comparison.

All load-capacities — 1, 1½, 2, 3, 4, 4½, 5, 6½, 7½ and 10 tons — with every form of load distribution. Exactly the right type for any given purpose, and all the types for any number of purposes. This makes possible uniformity of truck equipment, no matter how varied the requirements of a business. And that means economy in supervision, maintenance, and all garage charges.

Bodies suitable for the purposes for which individual trucks are to be used are built in our own body-plant.

With our complete variety of product there is no necessity of attempting to make the wrong truck do. Different from the makes in which one or two sizes must be adapted to a hundred uses, leading to owner's ultimate dissatisfaction.

Back of these unequalled facilities are important financial connections insuring quality of product and service, and stability of business relations.

Write for our Dealer's Proposition

International Motor Company

General Offices: 57th and Broadway New York Works: Allentown Pa; Plainfield N J

Sales and Service Stations: New York, Chicago, Philadelphia, Boston, San Francisco and other large cities

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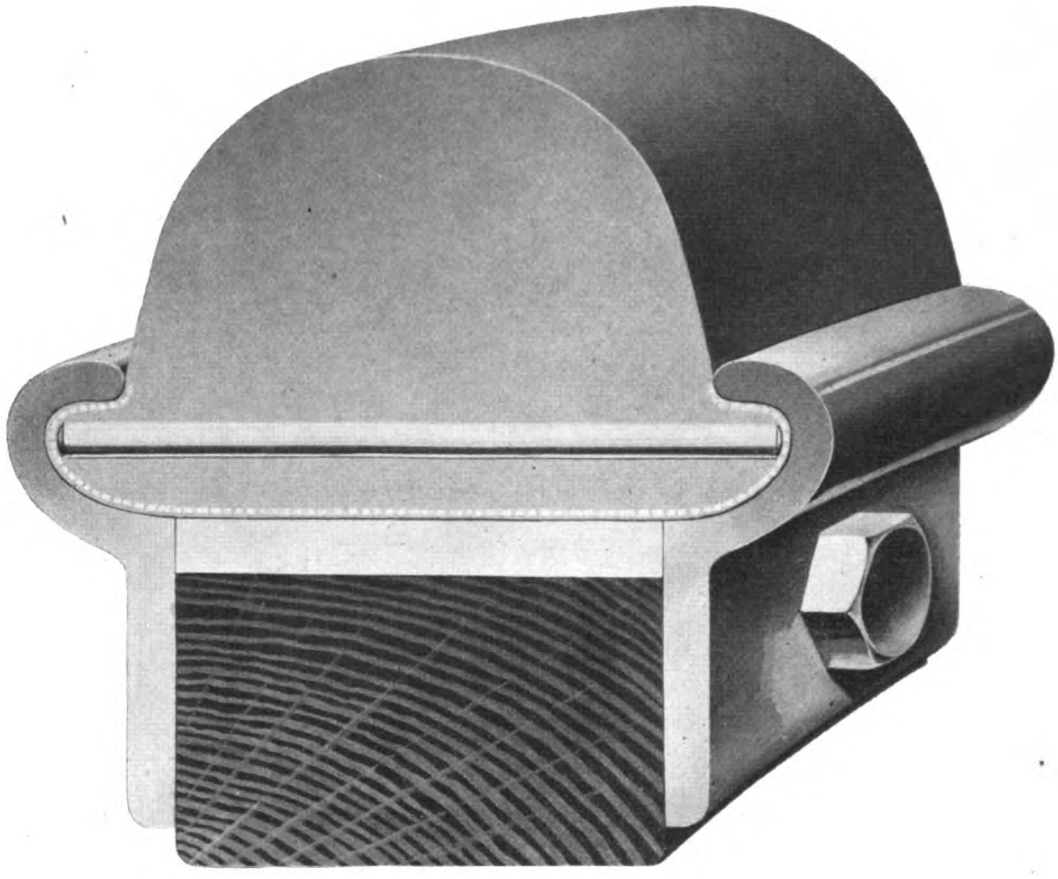

REPUBLIC MOTOR TRUCK TIRES

The greater part of disappointment and delay in your motor truck service can be eliminated by the use of Republic Motor Truck Tires.

Worn-out tires can be replaced in a few minutes by driver, without taking wheel off the truck.

Our guarantee fully protects you against inefficient service. Write for particulars.

THE REPUBLIC RUBBER COMPANY

Youngstown, Ohio

BRANCHES AND AGENCIES IN THE PRINCIPAL CITIES

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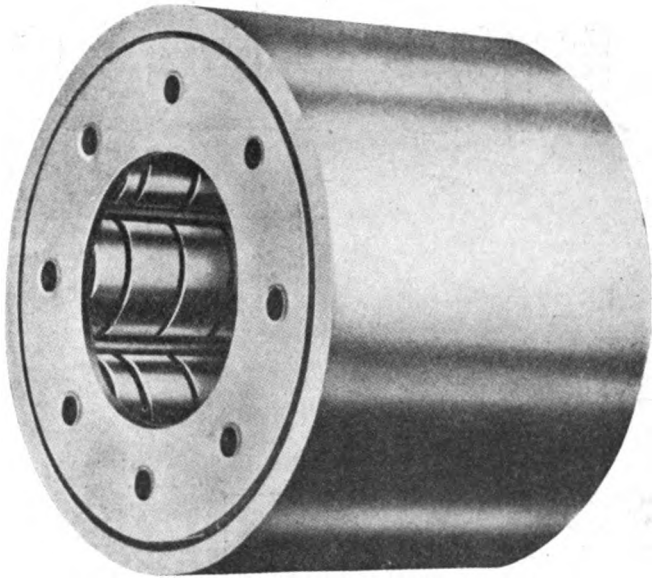

ESTIMATE, if you will, the enormous strain on the driving chains of a commercial truck when the powerful motor with its advantage of gear ratios, is pulling a load of several tons over a bad road---hauling freight under conditions as they exist about depots---and doing it day after day regardless of weather conditions.

It is only then that you can appreciate the tremendous work required of the bearings in the Transmission and Jack Shaft of such vehicles

Hyatt Roller Bearings are best suited to give long, continued service in these vital parts, because they afford line contact---are flexible, thus relieving the surrounding parts of shocks---and hollow rollers which have a self-cleaning feature that keeps the surface free from dirt and grit.

Hyatt Roller Bearings formed a regular part of the first automobiles built in America. At the present time there are millions in daily operation in every branch of motor car service.

HYATT ROLLER BEARING CO.
DETROIT, MICHIGAN

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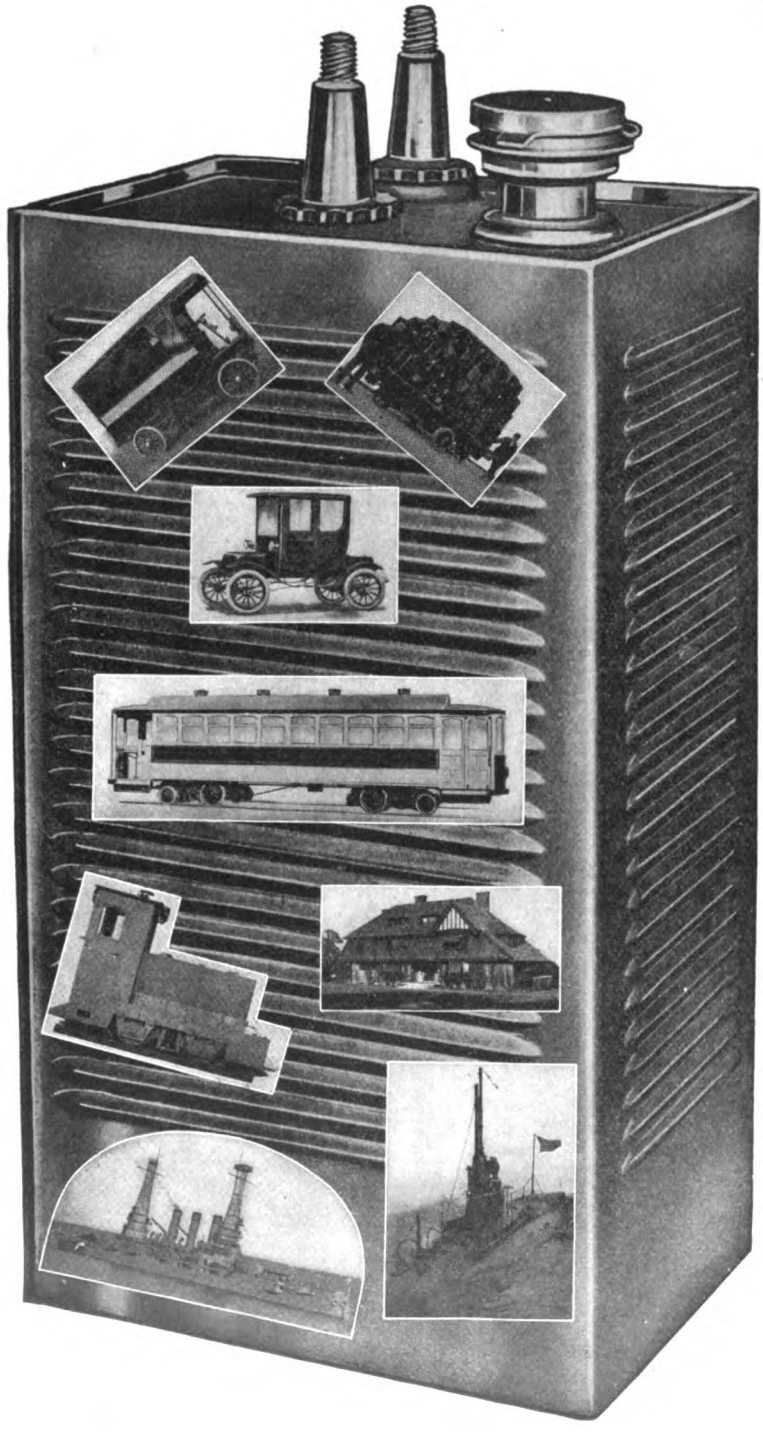
The Edison



As great an advance in world progress as was the Edison Incandescent Lamp Tremendously superior to all other storage batteries because:

It embodies an entirely new and correct principle.

It is lighter and vastly more durable.

Excessive vibration and concussion do not affect it.

No damage done by prolonged and oft repeated overcharging.

No injury from remaining idle in a charged or totally discharged condition indefinitely.

Extremely small loss of charge while standing idle.

Contains no acid, therefore no acid laden gases evolved.

No injury to metal work from gases.

No personal discomfort from gases.

Short-circuiting does it no injury.

It maintains its capacity for many years.

Digitized by Google

Storage Battery

"Built like a watch but as rugged as a battleship"

No buckling or growing of plates
No plate renewals.
No shedding of active material.
No sediment in jars.
No cleaning of jars.
No breaking of jars.
No sulphation or corrosion of parts.
No expert attention required.
It has changed the entire aspect of the electric pleasure vehicle situation.
It makes the electric truck a profitable investment by eliminating battery repair and renewals and insuring reliability.
It banishes unsightly trolley wires for street car propulsion.
It makes the electric locomotive a safe proposition in mines and powder mills,
It renders expensive railway terminal electrification unnecessary.
It changes taxicab operation from loss to profit.
It solves the train lighting problem.
It has added new life to country house lighting.
It practically doubles the strategic efficiency of the submarine and will outlast any boat in which it is installed.
It can be relied upon for power in emergency, for illuminating magazines and handling rooms, hoisting ammunition, operating turrets and laying guns.
It is dependable for sight lighting and gun firing, even if charged only once in six months, and is the only storage battery made that will stand up to concussion of gun fire.
It will operate your Klaxon horn one year on one charge; will light your car, run your ignition system, furnish power for your electric self starter and last for many years.

Manufactured in Sizes from 1 Ampere-Hour Portable to the 15,000 Ampere-Hour Submarine Types

We are runing an interesting continued story on the Edison Storage Battery Development, Theory, Construction, and Application, in the advertising columns of the Army and Navy Journal, Journal of Commerce Engineering and Mining Journal, Electrical World, Manufacturers' Record, Iron Age, Motor Age and The Automobile, by Miller Reese Hutchison, Chief Engineer and Personal Representative of Mr. Edison. Beginning with the weekly issues published about March 1st, 1912. They are of general interest, judging from the widespread favorable comments we are receiving.

APPROVED:

Thomas A Edison

EDISON STORAGE BATTERY CO.
102 Lakeside Avenue
ORANGE, N. J.

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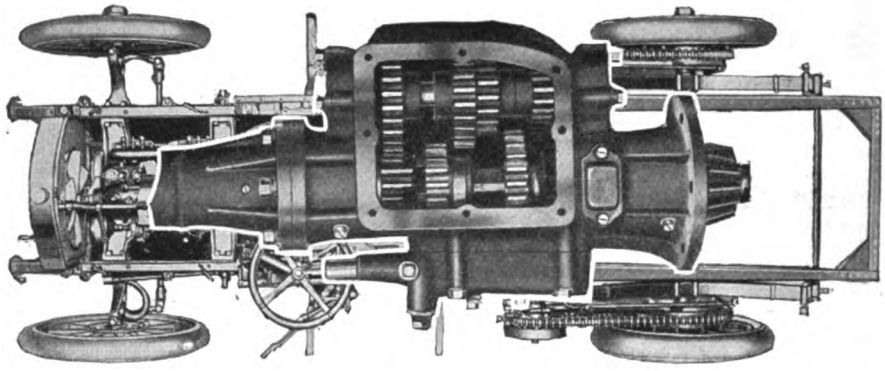
COVERT



TRUCK BUILDERS recognize the Transmission as THE PREDOMINATING FEATURE of a successful truck. Experience has proven the Covert Transmission a product of uniform high quality—a product that is dependable.

Materials of the very best grade—workmanship which has long become specialized—and years of experience in making transmissions, enables a better article to be produced at a lower cost.

There is a Covert Transmission for every type of automobile, both commercial and pleasure. While protecting you, they insure your customer. Manufacturers are invited to investigate.

COVERT MOTOR VEHICLE COMPANY
Sales Offices: Ford Bldg., Detroit, Mich.
Factory: Lockport, N. Y.

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FIRST LOAD OF LUMBER
to be delivered to
Panama-Pacific Exposition Grounds
Furnished by SAN FRANCISCO LUMBER CO.
hauled by FEDERAL 1 TON TRUCK
1915

The Federal Truck hauling the first load of materials for the Panama Exposition in San Francisco

Federal One-Ton truck chassis, including seat, $1800. Body type at purchaser's option. Wheelbase, optional 110 inch or 144 inch; Motor, 4 cylinder, 30 horsepower; Magneto, high tension; Clutch, 16-inch cone; Transmission, three speeds forward and reverse; Timken bearings in wheels; Tires, solid, 36 x 3½-inch front — 36 x 4 inch rear.

THE PIONEER OF PROGRESS

AS USUAL

THE FEDERAL

This is the extraordinary recognition that has come to the Federal One-ton truck. In Efficiency, Reputation and Price the Acknowledged Leader.

When the Federal one-ton truck sold for $2200, it led all standard one-ton trucks.

When the price of the Federal was reduced to $1800, it gave the Federal an advantage of from $400 to $500 over all other standard one-ton trucks of the Federal's rating.

It gave the Federal a start of one year on all worthy competitors; for where other one-ton trucks will be a year hence, the Federal is today.

It put from $400 to $500 into the pocket of the discriminating manufacturer who had already recognized in the Federal one-ton truck the standard of efficiency, reliability, economy in his delivery and trucking problems.

The demand for Federal trucks doubled in two weeks following the announcement of the $1800 price.

To meet that demand the Federal moved into a new factory with vastly increased capacity.

Today the demand for Federal trucks is treble that of a year ago.

That astonishing price, $1800, is possible now—

Because we buy materials in enormous quantities;

Because we are specializing and concentrating all the energy, engineering skill and capacity of our factory and the huge momentum of our success in the new Federal one-ton truck. All our success goes back into the Federal.

The Federal is the first and only one-ton truck to guarantee a maximum of service and quality for a minimum of investment and upkeeping-cost.

That is the Reason

The Federal Model C, 110-inch wheelbase, with its short-turning radius, its strong, compact body, its great power, its unfallible reliability—now dominates the field of city trucking.

FEDERAL MOTOR TRUCK CO., DETROIT, MICH.

New Factory Dept. C., Leavitt and Campbell Aves.

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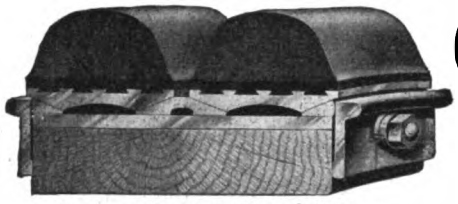
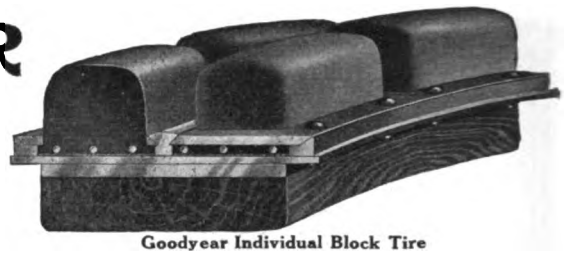


Goodyear Demountable Solid Tire—
Guaranteed 10,000 Miles

GOODYEAR

"A Tire for Every Service"



Goodyear Individual Block Tire

Two New Goodyear Tires

We regard these two new motor truck tires as remarkable inventions.

We place them right alongside of Goodyear No-Rim-Cut Pneumatic Tires.

For they will be welcomed as much by *Motor Truck* owners as "No-Rim-Cuts" are by *pleasure car owners*.

Our Demountable Tire

Your driver can quickly replace this *demountable* tire. No more sending wheels away or even removing them. No more trucks tied up awaiting tire repairs or replacement.

And this tire has a *steel-and-hard-rubber base*. The base *can't* wear out before the tread.

In fact, a specific 10,000-mile guaranty countersigned by the Goodyear Tire & Rubber Co goes with each set of Goodyear "Demountables".

Furnished in single or dual tread. Adapted to medium-sized or heavy trucks.

Our Individual Block Tire

Each block has its own, individual fastening—is held securely—can't work loose—can't chafe and thus wear itself out underneath.

The base always outwears the tread.

Unscrewing two nuts and lifting off the individual metal fastening loosens the block. Any one can do it and replace the block—with wrench and clamp.

No extra tire equipment needed except a few blocks. Your truck is never laid up by tire trouble.

This tire is for heavy trucks—gives greatest traction and is non-skid.

Tires for Light Cars

For light cars we make two tires. The "Goodyear Solid No-Rim-Cut" and the "Goodyear-Motz." Each possesses amazing resiliency, is easily applied and gives maximum mileage.

Before equipping your light car, learn about these excellent tires.

Consult Our Engineers

They can tell you exactly the tire that's adapted to your truck.

State make and model of your car; the style of wheels and rims; the kind of roads over which your car is driven. Address

The Goodyear Tire & Rubber Company, Akron, Ohio

Branches and Agencies in 103 Principal Cities **We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits**

Main Canadian Office, Toronto, Can. **Canadian Factory, Bowmanville, Ont.**

AUTOBESTINE

BEST BRAKE LINING

WOVEN STEEL HOSE & RUBBER CO.

TRENTON N.J.

Autobestine is now recognized as the very best lining on the market by the leading axle and auto manufacturers. It is uniform in thickness, size and wearing quality, and maintains its wonderful coefficient friction until worn down to the last sixteenth of an inch. It is the only brake lining that holds its customers year after year. The following well known axle and automobile manufacturers use it:

Timken-Detroit Axle Co.
Cadillac Motor Car Co.
Pullman Motor Car Co
Mercer Auto Co.
Alden-Sampson Co.
Pope Manufacturing Co.
Cole Motor Car Co.
F. B. Stearns Co.
Lewis Axle & Spring Co.
Standard Roller Bearing Co.
E. R. Thomas Motor Co.
The Autocar Co.
Speedwell Motor Car Co.
Russell Motor Car Co.

And many others.

Costs no more than inferior linings. Simply insist that your dealer gives you

AUTOBESTINE

Beware of cheap imitations using similar names.

Send for descriptive circular

WOVEN STEEL HOSE & RUBBER CO., Trenton, N. J.

NATIONAL SALES CORPORATION

Factory Sales Manager

NEW YORK 250 W. 54th St. | CHICAGO 1436 Michigan Ave. | DETROIT 844 Woodward Ave.

HAYES WHEELS

Motor truck service is so arduous that only the best wheels should be provided as equipment.

Machines fitted with our product are practically assured of low tire expense.

Hayes Wheels will withstand the severest punishment. They afford both *"Quality and Service."*

Large or small orders invited. ¶ S. A. E. Bands in all sizes carried in stock. ¶ Our engineering force is at your command.

HAYES WHEEL COMPANY

JACKSON, MICHIGAN

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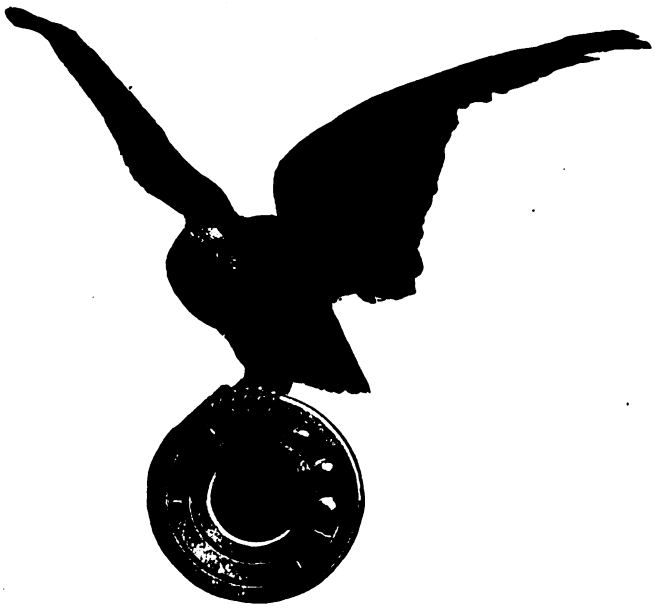
J. S. BRETZ COMPANY

F & S
Annular Ball Bearings



Directions for
Mounting, Care and Treatment
with Examples of Design
of the Patented
Fichtel & Sachs Ball Bearings
and also
Thrust and Double Thrust Bearings

SOLE IMPORTERS

APRIL, 1912

JUST OUT

MAY WE SEND IT TO YOU?

THE illustration above is a full-sized reproduction in black and white of the cover of a very interesting twenty-four page booklet just off the press, and the title page tells its own story, but to which we have added a chapter on Lubrication. The text, illustrated by thirty drawings, is printed in black on heavy, coated, India tinted paper with the borders in brown, the whole forming a simple, practical, elementary treatise on the subject, and which should be carefully read and studied by those interested in the conservation of energy by the application of ball bearings to revolving parts.

J. S. BRETZ COMPANY
SOLE IMPORTERS
F & S Ball Bearings
250 West Fifty-fourth, New York

P. W. *Please send Booklet to*
Name.....
Address.....

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POLACK TRUCK TYRES

by their **absolute guarantee** assure a lower cost per mile than any other tyre made.

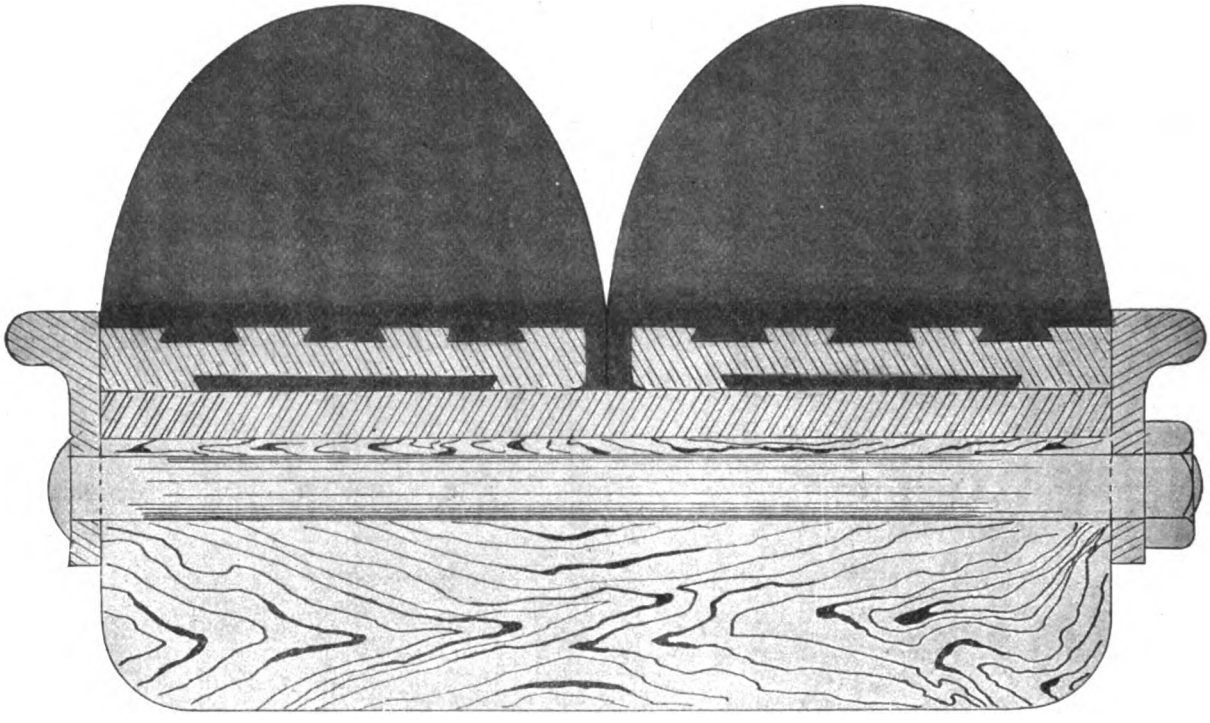
If fitted with the sizes which we recommend for a three-ton truck the tyre cost per truck mile is **5¼** cents, **maximum.**

For a 5-ton truck the **maximum** tyre cost is **7¾** cents per mile.

This cost will be reduced according to the additional mileage secured above the guaranteed service.

This additional service amounts to from 50% to 200% above the guaranteed mileage, according to road conditions and the care with which the truck is operated.

The costs published by experienced operators of trucks show an **average** tyre cost with other tyres of 8¾ cents to 11 cents per mile.



After January 1st, in addition to the present European standard sizes, Polack Tyres of the demountable type will be supplied in sizes to fit American S. A. E. standard wheels.

Polack Tyre Company

Ehret Building, Broadway and 59th St., New York

1004 Michigan Ave., Chicago
247 Jefferson Ave., Detroit
512 Mission St., San Francisco
146 Sumner St,, Boston, Mass.
503 Liberty Ave., Pittsburg
917 First Ave. So., Minneapolis
930 So. Main St., Los Angeles
516 Parkway Bldg., Philadelphia, Pa.
Benoist & Aull, Benoist Bldg, St. Louis

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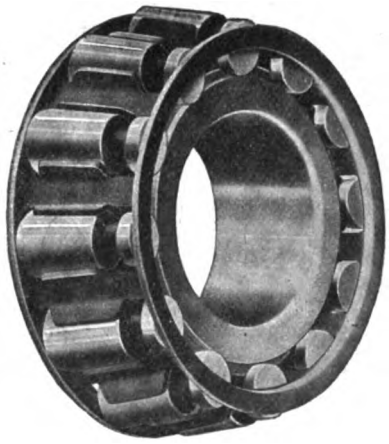

Timken Roller Bearings at the Big Show

73 6-10% of the car and truck builders who exhibited at *Madison Square Garden* use Timken Roller Bearings in part or throughout.

44 7-10% of the car and truck builders who exhibited at *Grand Central Palace, New York*, use Timken Roller Bearings in part or throughout.

70 2-10% of the pleasure car builders who exhibited at the *Coliseum, Chicago*, use Timken Roller Bearings in part or throughout.

52 9-10% of the motor truck builders who exhibited at the *Coliseum, Chicago*, use Timken Roller Bearings in part or throughout.

The reason for such wide adoption of Timken Bearings is that they give satisfactory service in every place where they are used.

The Timken Roller Bearing Co.

Canton, Ohio, U. S. A.

The only axle manufacturer licensed to make automobile axles equipped with Timken Roller Bearings is The Timken-Detroit Axle Co.

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A good way to keep ahead is to start ahead.
The Gibney type of tire is three years ahead. The verdict of users has caused tire manufacturers to recognize its superiority, and the Gibney type is being universally copied in 1912. J. L. G. & Bro 4/1/12

Gibney Wireless

The Three-Years-Ahead Tire

THE three years' start we have had means three years of experience, which in turn means a superior product and therefore better value for the buyer. This certainly means something to you.

There probably is no product that will go wrong quicker than tires, if the man making them has not had experience. Theories as applied to tires are costly. Experience is a dear — but good — teacher. You get the benefit of our experience, consequently you run no risk.

What the other fellow says ought to interest you. He has paid for his knowledge and his endorsement is impartial:

Extract from letter dated Nov. 10, 1911:

"....To date we have used a number of tires made by you on our heavy electric trucks in our delivery service. We have always found these eminently satisfactory in every respect, and they were good for the time guaranteed. ....They never failed us under the most adverse conditions of heavy loads and bad streets. Our tire expense has been materially reduced since using your tires and efficiency greatly increased."

(Signed)
AMERICAN BREWING CO.,
Philadelphia.

WE are quite proud of the fact that users of **Gibney Tires** write us enthusiastic letters, and while we reproduce but one in each advertisement, we would be pleased to send you copies of many. We feel that the buyers' good will is the seller's good fortune, and that is why we have always tried to make **Gibney Tires** so good that every one would be an asset which we could place in our good-will column. We sell service and show that in mileage **Gibney Tires** average better than others. We would be pleased to have you tell us your requirements, so that we may give you quotations.

JAMES L. GIBNEY & BRO.

217 N. Broad Street, Philadelphia **248-52 W. 54th Street, New York**

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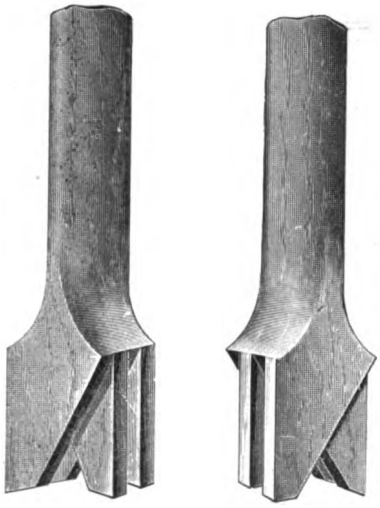

Schwarz Patent Spokes

Schwarz Wheels

are used on all leading Motor Trucks

Wheel for Heavy Motor Truck

Because they are STRONGEST, SAFEST and MOST ECONOMICAL; will stand up continuously under heavy strains; and are made with a first regard to quality and finish.

The construction of the SCHWARZ WHEEL alone insures its strength and durability. Spokes at the tenon are grooved and mortised, and interlock—forming an absolutely compact and immovable assemblage which cannot loosen. It is the only wheel with positive and evenly distributed spoke support.

Can be made complete and shipped without hub.

We are pioneers in the manufacture of heavy truck wheels and the largest producers. We maintain a large, fully equipped department devoted exclusively to this work and are pleased always to design and proportion wheels in proper keeping with other features of construction. Consult us.

We make Automobile Wheels exclusively—for both pleasure and commercial cars.

Write for information.

We carry a full line of S. A. E. truck wheel bands.

THE SCHWARZ WHEEL CO.

FRANKFORD **PHILADELPHIA**

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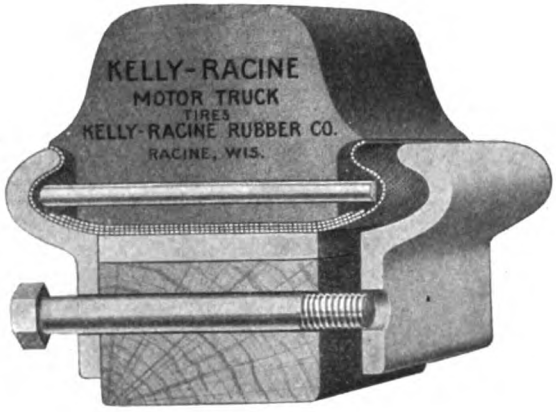

Note how the cross wires are imbedded in the "hard Rubber" Bead insuring

"Positive Security of Fastening"

Take off your Pneumatics

Apply Kelly-Krotz Tires on same rims

WRITE DEPT. "T" FOR PRICES AND FULL PARTICULARS

Kelly-Racine Rubber Co., - Racine, Wis.

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Standard Parts

For Motor Truck Builders

¶ With the exception of springs and wookwork, we manufacture a complete line of standard parts for motor trucks of 1, 2, 3, 4 and 5 ton rating.

¶ We will gladly furnish prints of chassis of models which can be built up from parts we make.

¶ Firms engaged in the production of motor wagons should not overlook the importance of investment entailed by providing both factory space and facilities for assembling. Money must be freely spent for this purpose for a number of years to come, while throughout the period the models produced will be gradually assuming final form. Whatever this minimum investment may be, it must be apparent at the outset that the only way to keep it low, and at the same time maintain factory output, is to draw upon the engineering skill and resources of the parts maker, who in order to exist must provide unusual facilities for quantity production and anticipate every change in a very sensitive market.

¶ We have the reputation for doing big things in a big way. Our large plant and our talented engineering force are wholly at your service in order to simplify your problems of production.

¶ If you need advice from a firm which has acquired experience in the making of motor truck parts—and knows the arduous duty to which they are subjected in commercial practice—consult us.

Blue Prints on Application.

Driggs-Seabury Ordnance Corporation

SHARON, PENNA.

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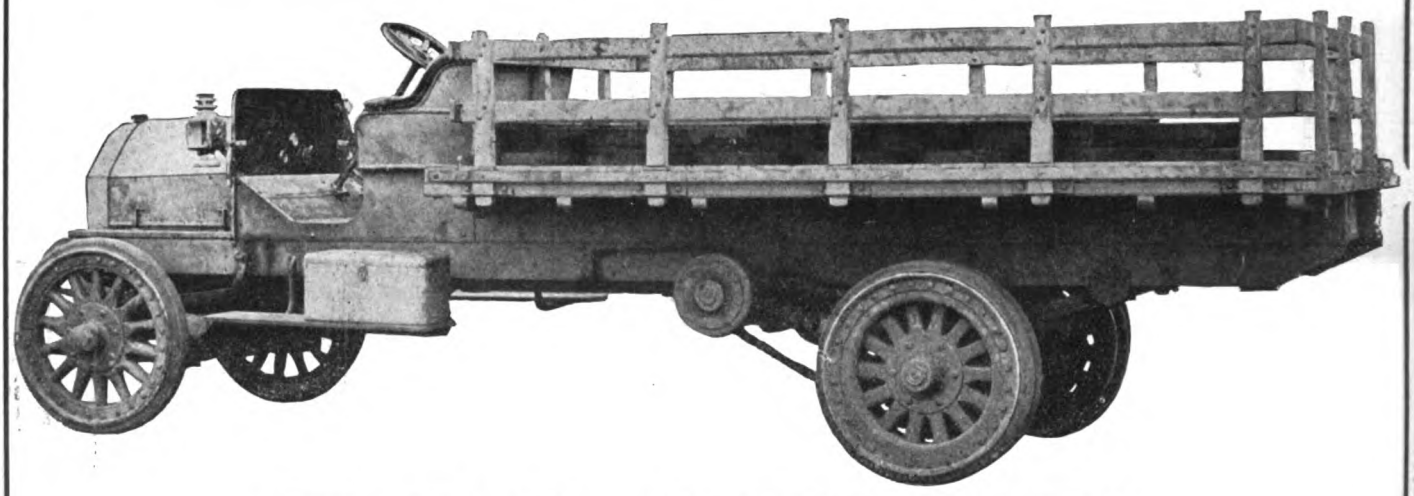

POLARINE

The Most Durable and Efficient Lubricant for Motor Trucks of Every Make

Commercial vehicles are subject to far more wear, far more strain, far more friction, than the ordinary pleasure car, and the best engine ever constructed will break down if the lubrication is not of the best.

Polarine Oil

does not thin out under any conditions of hard service. It feeds uniformly in the hottest or the coldest weather. It does not carbonize spark plugs, valves or cylinders.

Polarine Transmission Lubricant "A"

Light Body. For transmissions where construction and condition permit the use of a semi-fluid oil.

Polarine Transmission Lubricant "B"

Medium Body. For transmissions and differentials where construction or condition requires a semi-solid lubricant.

Polarine Transmission Lubricant "BB"

Heavy Body. Specially recommended for Summer use on transmissions and differentials.

Polarine Cup Grease

A solid lubricant for grease cups, ball and roller bearings, etc.

Polarine Fibre Grease

A solid lubricant, slow to melt, particularly adapted for use on parts requiring a product of a fibrous nature.

Write for the Polarine Booklet.

Standard Oil Company

(An Indiana Corporation)

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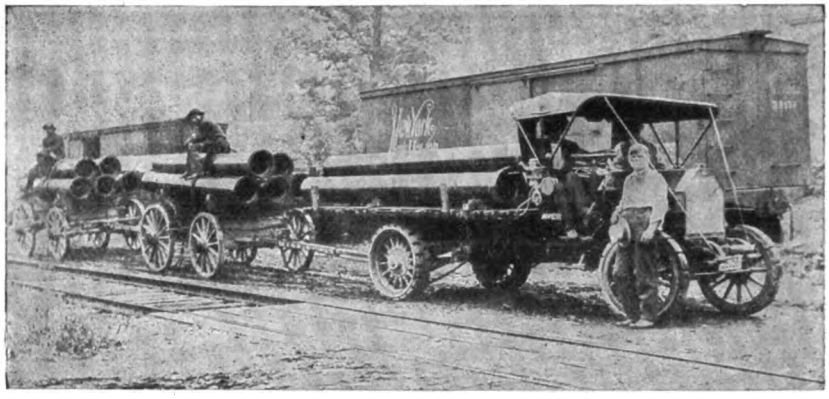


The Truck that Does the Most Work

Is the **Avery**—Here's Why—

It hauls big loads on its own bed.
It pulls trailers behind.
It has special wheels for city or country hauling.

Find out about the work the Avery will do.
How they carry full capacity loads and pull more than their capacity on trailers behind.
How they can be equipped with Rubber Tires for City Hauling and Wood Plug Tires for Country Hauling.

Get all the Facts about the Avery Truck

—the truck that does the most work. Also write now for complete catalog showing actual working scenes and giving full description. Address,

Avery Company - Manufacturers
949 Iowa Street - Peoria, Ill.

Save Power! Save Wear on Your Car! Save Tire Expense!

The Motz Cushion Tire offers these ECONOMIES.

It saves wasting power. That is one reason why 90% of all pleasure electric car makers have adopted Motz Cushion Tires as standard equipment. They, above all others, are sticklers for **high efficiency** tires.

Again, no light car can long withstand the bumps and jars of continuous driving unless its **mechanical parts** are protected. Motz Cushion Tires **give** that protection. Solid tires **do not.**

And, since it's unaffected by punctures and blowouts, this tire far excels treacherous pneumatics.

IT OUTWEARS SOLID RUBBER TIRES! Motz Cushion Tires are guaranteed for **TEN THOUSAND MILES—Two Years.**

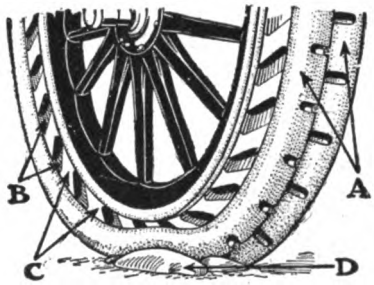
EASY-RIDING TIRES

No properly inflated pneumatic tire can be more easy riding than this. Note the "Motz" construction—double treads, which prevent skidding and distribute the weight to the sides. The undercut sides allow free action of the bridges. The slantwise, elastic bridges give and yield like the air in a pneumatic tire.

Motz Cushion Tires fit any standard clincher, universal quick detachable or demountable rim.

Where speed and not carrying capacity is the big factor Motz Cushion Tires should be used.

The Tire for Light Delivery Cars



A—Shows double, notched treads.
B—Shows undercut sides.
C—Shows slantwise bridges.
D—Shows absorbing means when passing over an obstruction.

MOTZ SOLID TIRES

For heavy duty trucks—where load, not speed, is the principal factor—we recommend Motz Solid Tires on demountable rims. Your driver can replace this tire at any time without so much as removing the wheel. Motz Solid Tires have positive fastening. Cannot wear out at base before tread has given full service.

WRITE FOR CATALOGUE—Let us tell you more about these **economy** tires. Please give make, model and duty of your car. Ask for booklet **92.**

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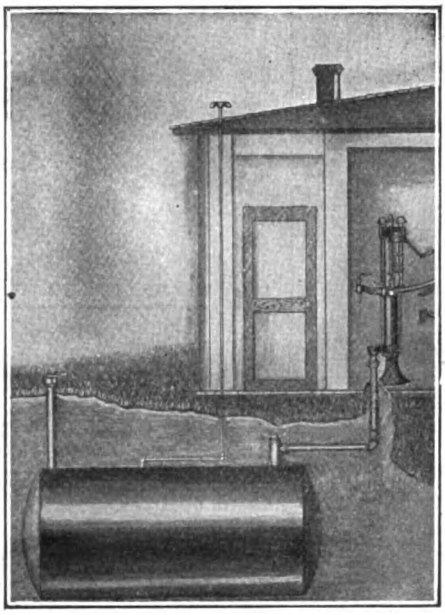

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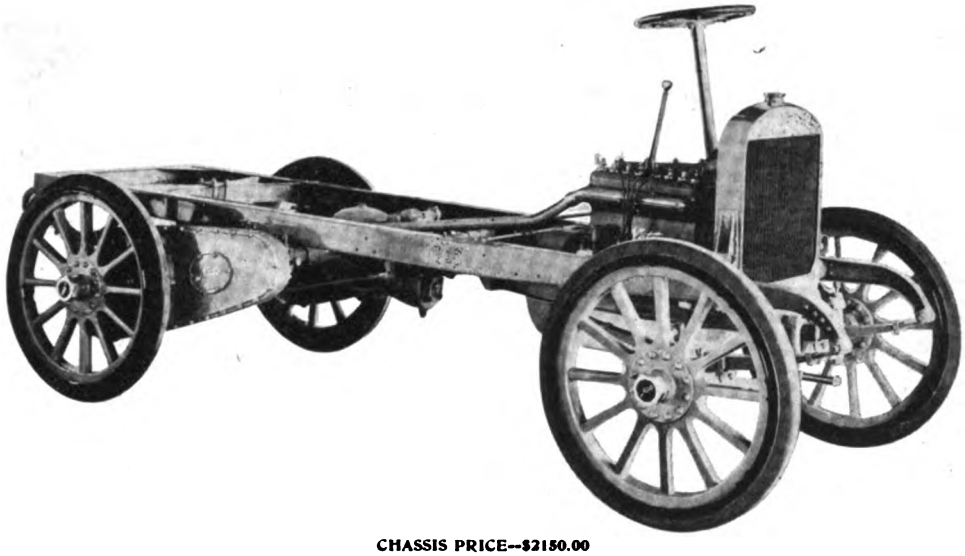

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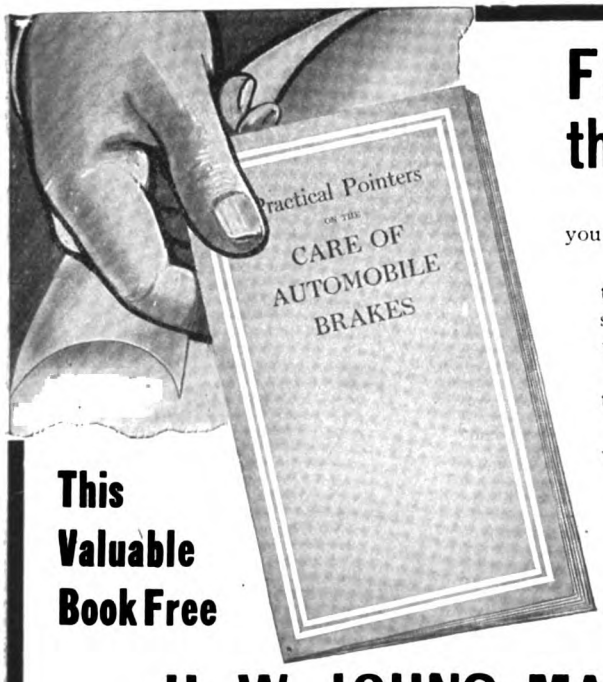

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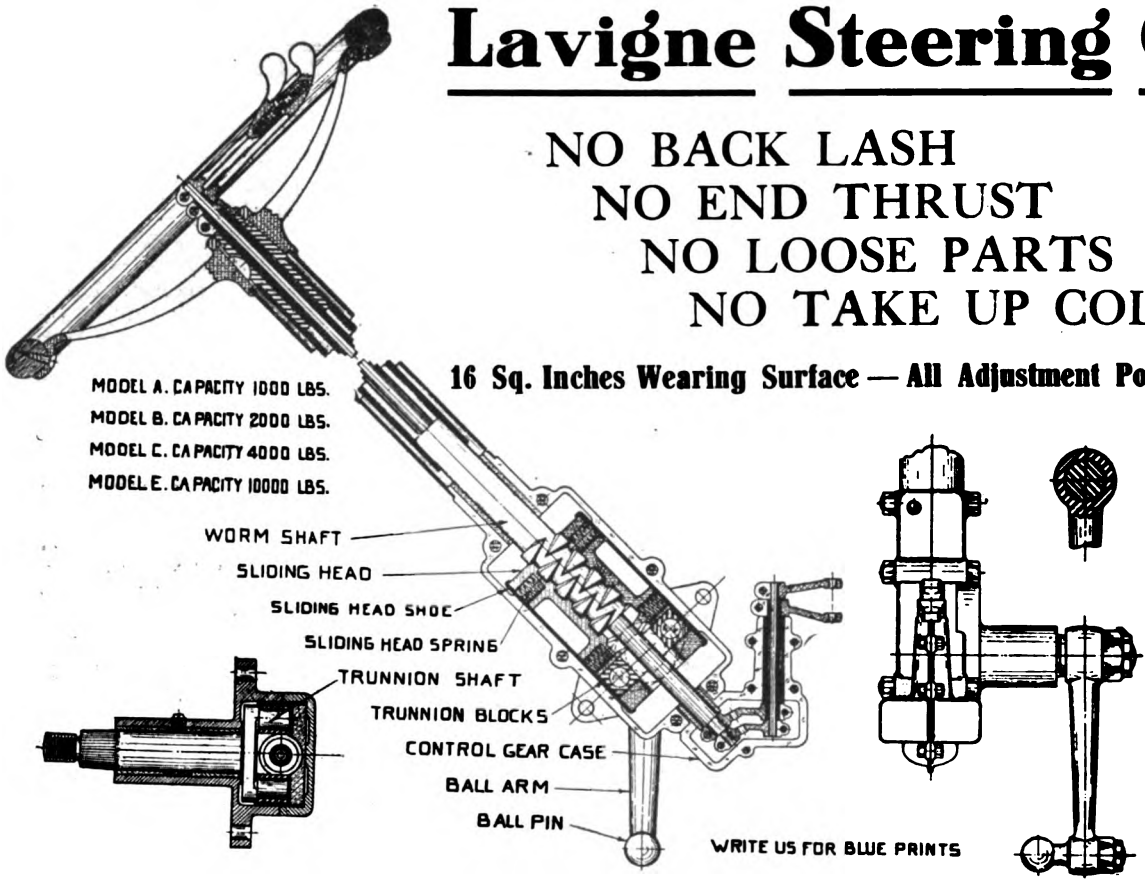

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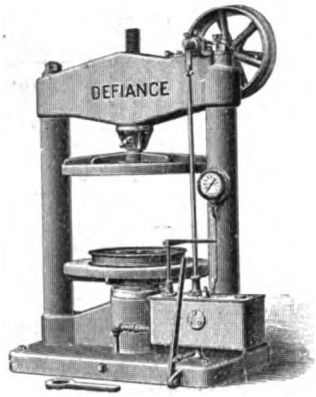

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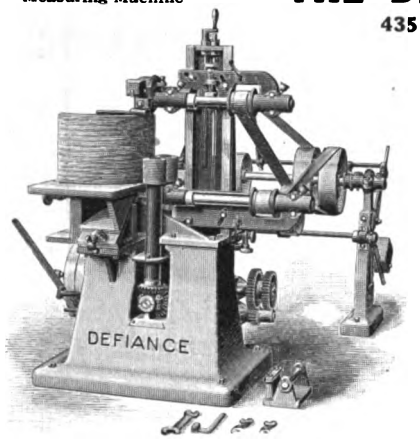
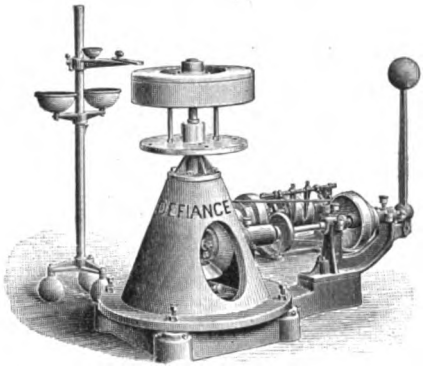


No. 6 Heavy Auto Truck Rim Planer



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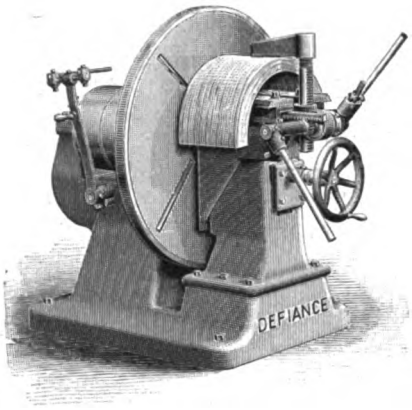

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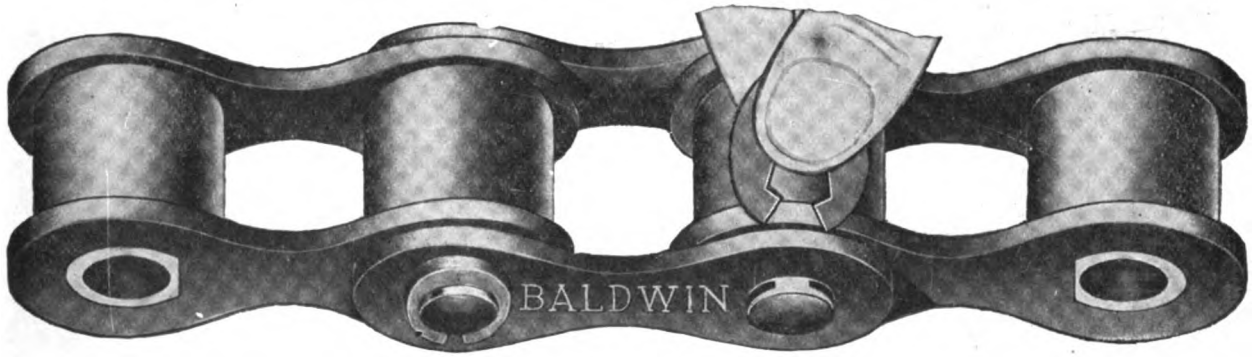

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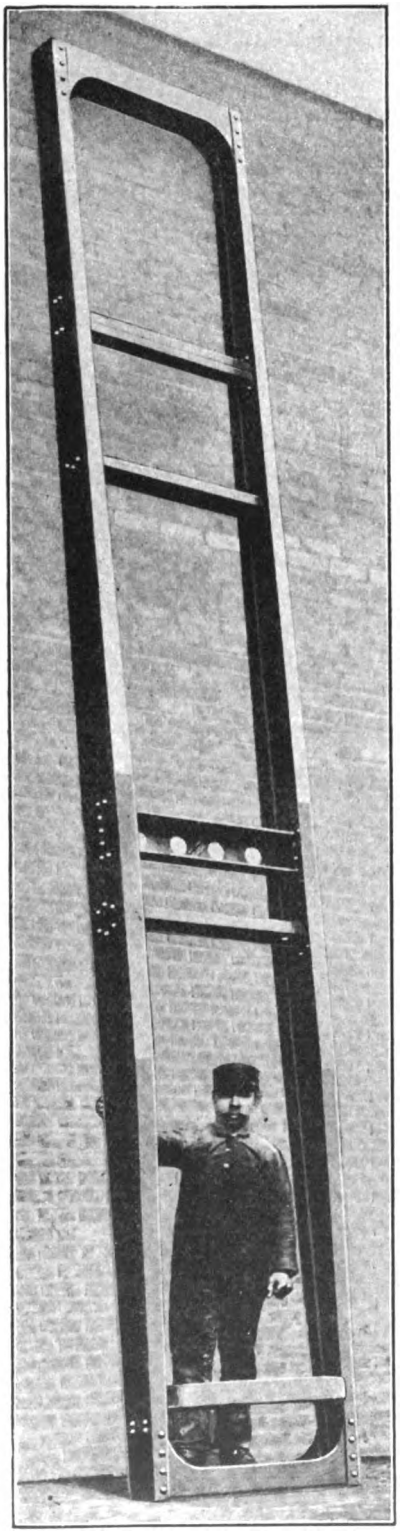

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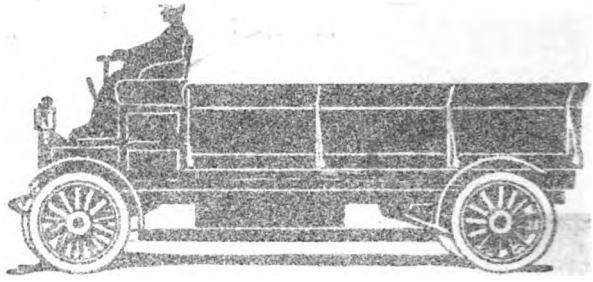

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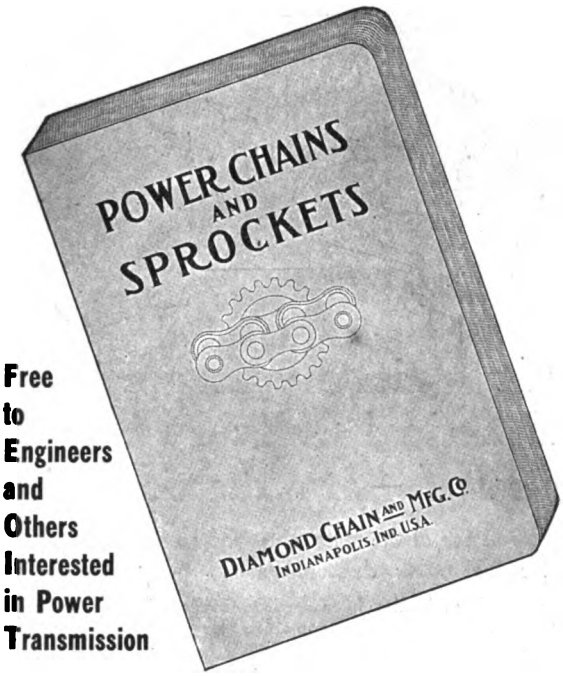

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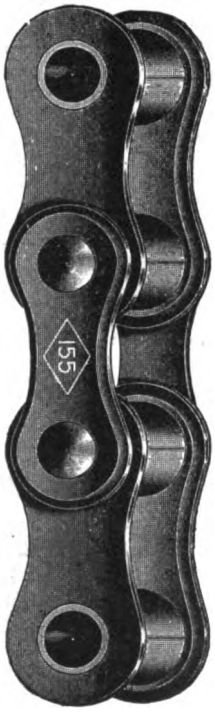

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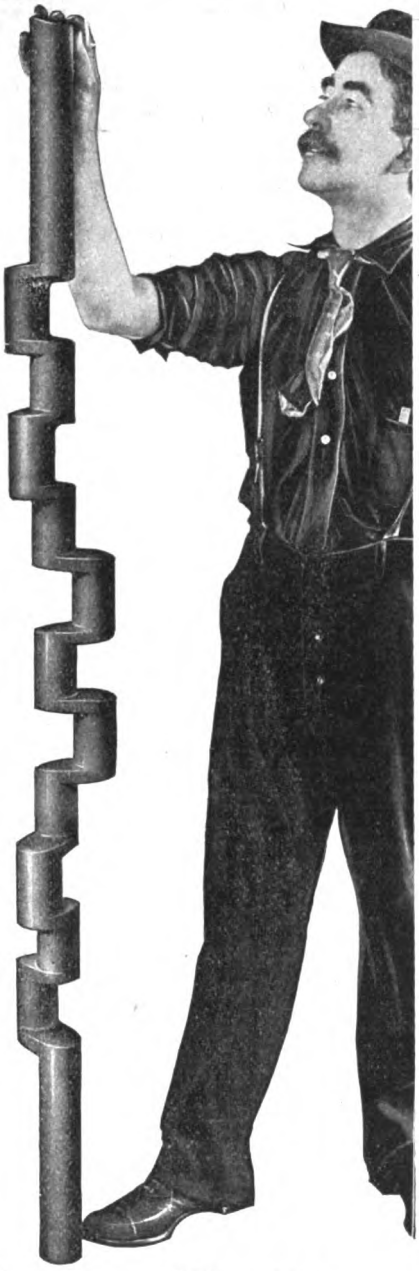

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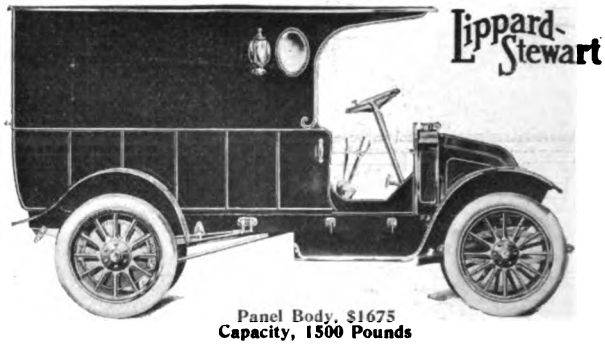

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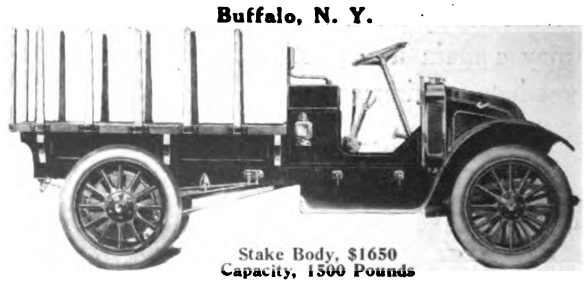

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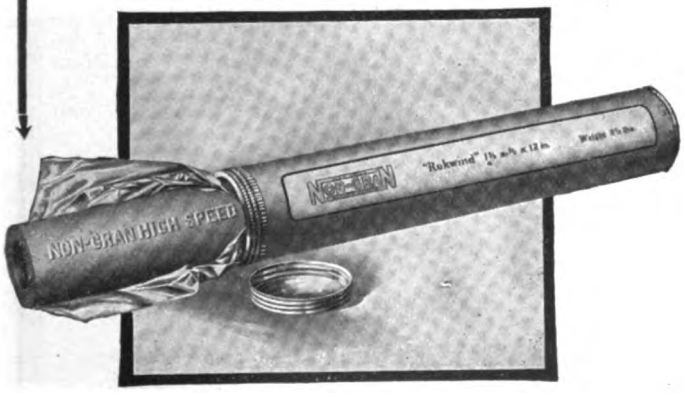

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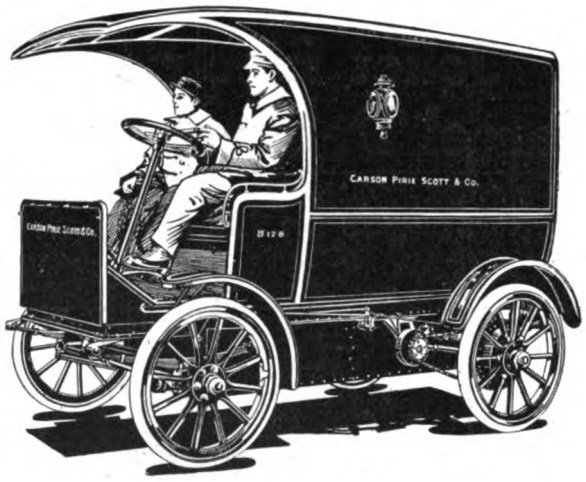

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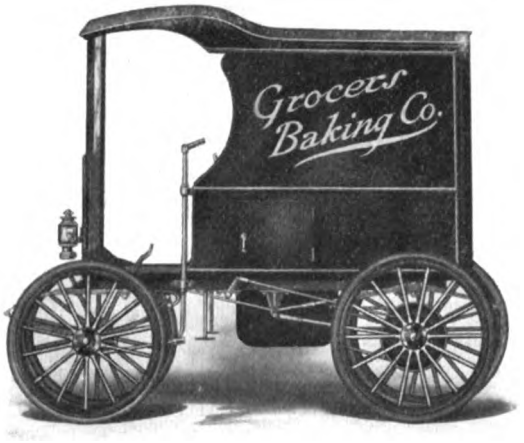

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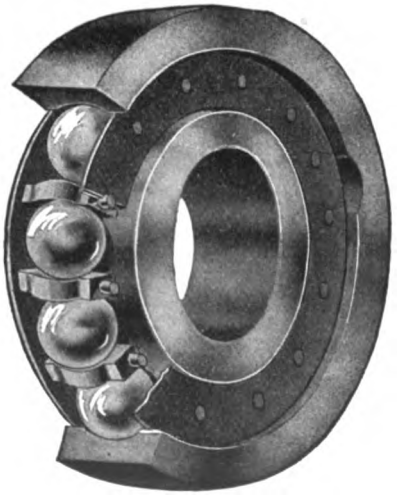

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Write for catalog and prices

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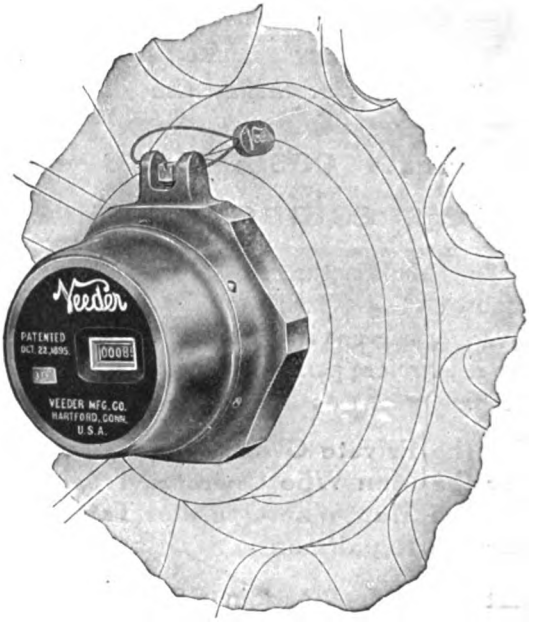
Sole Importers

42 Broadway **NEW YORK**

Veeder
Hub Odometer



No Commercial Car is complete without this instrument. It registers the distance traveled backward as well as forward. It cannot be disconnected by slipping gears out of mesh. The record cannot be tampered with. It is impossible to subtract mileage by running the wheel backward or to falsify returns by putting the odometer out of service during a run.

The VEEDER HUB ODOMETER is "on the job" all the time! Attached to the hub and sealed, it is impossible to alter the record without removing it. To accomplish this it is necessary to unscrew the odometer, first breaking the seal, and thereby making it apparent that the instrument has been tampered with. In no other way can the record be altered.

A valuable instrument for pleasure cars, the VEEDER HUB ODOMETER is absolutely indispensable for trucks and taxicabs. It furnishes a positively accurate record for the estimate of mileage costs. On taxicabs it furnishes a protection to the owner, eliminating every possibility of loss through drivers' dishonesty and offering a means of comparing various cars in respect to their returns and mileage.

Price complete — ready for attaching — $25.00, at your dealer's, direct from our factory or at the following depots:

T. H. CRANSTON & CO., 56 E. Randolph St., Chicago, Ill.
L. H. & B. I. BILL, 543 Golden Gate Ave., San Francisco, Cal.
THE RUBBER TIRE WHEEL CO., Montreal, Quebec, Toronto, Winnipeg and Vancouver.

The Veeder Manufacturing Co.

HARTFORD, CONN.

Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Small Die Castings.

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THE "SPICER"

universal joint was the pioneer for shaft driven automobiles—either pleasure or commercial cars.

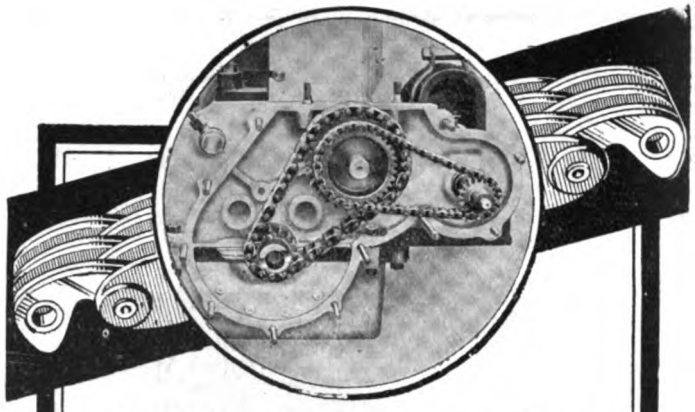
Consult Our Representatives:

K. FRANKLIN PETERSON,
122 So. Michigan Boulevard,
Chicago

THOS. J. WETZEL,
17 West 42d Street,
New York

L. D. BOLTON,
1810 Ford Building,
Detroit

Special Foreign Representative:
BENJ. WHITTAKER, 21 State Street, New York



The Highest Standard of Efficiency
in magneto, camshaft, and pump drives is reached by the application of the economical, reliable and silent

COVENTRY NOISELESS CHAINS

The precision, automatic retention of pitch and long life are a few of the facts taken into consideration by many manufacturers of the most silent, reliable, and fashionable cars who fit these chains exclusively.

The services of our experts are at your disposal.

WRITE TODAY.

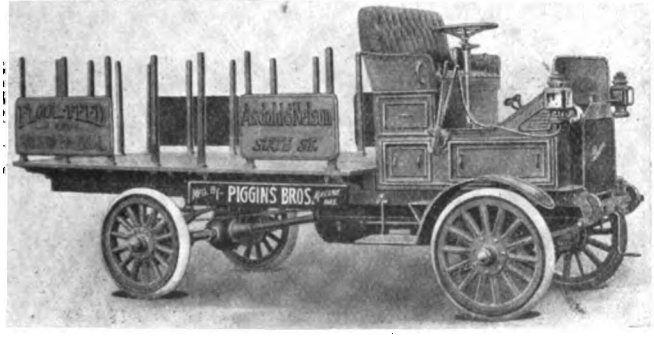
United States Representatives:
SARCO ENGINEERING CO.
114 Broad St., New York

THE PIGGINS MOTOR CAR CO.

of Racine, Wisconsin, manufacture a complete line of motor trucks from 1 to 10 tons capacity.

Simplicity and accessibility are the dominant features of our long stroke truck motor.

Also as there is no chains to break and no sprockets to wear out as our trucks have a double rear axle and are all gear driven.



Two-ton model of Piggins Motor Car Co., Racine, Wis.

Send for catalog showing complete line of models.

Choice territory open to responsible dealers.

PIGGINS MOTOR TRUCK CO.
RACINE :: :: WISCONSIN

Lubricating The Motor Truck

The hands on your watch would be almost useless if used on a clock face, and for the same reason ordinary lubricants cannot successfully carry the heavy motor truck up hill and down and over all sorts of roads.

DIXON'S MOTOR LUBRICANTS

are ideally adapted to meet the difficult lubricating requirements of the motor truck, for flake graphite, their basic ingredient, has time and again proved its efficiency where other lubricants have utterly failed. May we send you free sample 229-G?

Joseph Dixon Crucible Company
Jersey City, N. J.

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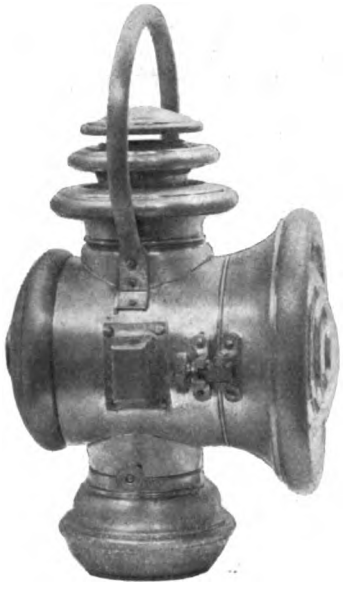

Our **TRUCK LAMPS** *are*

Practical — **Substantial** — Desirable
in all details.

THE CASTLE LAMP CO.
AMESBURY, MASS.

Adams Trucks
"Deliver the Goods"

On the ADAMS TRUCK you can build a big business. It is so simple, so substantial, so well constructed, that it gives real service and satisfaction. The engine parts are easily accessible without stooping. A liberal overload is provided for. The price is right. Altogether it is a most interesting proposition.

We still have some good unoccupied territory.

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THE ADAMS BROS. CO.
FINDLAY, OHIO

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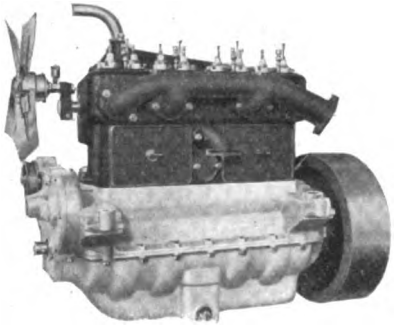
"CONTINENTAL"
COMMERCIAL MOTORS

Designed for Heavy Work.

Manufactured in one-ton to seven-ton capacity.



They contain all the important, up-to-date features, such as long stroke, large valves, heavy bearings, perfect lubricating system, enclosed valve mechanism, etc.

Furnished as independent motors or in complete Unit Power Plants.

Let this noted motor make a reputation for your truck.

Write for specifications, prices and terms.

CONTINENTAL MOTOR MFG. CO.
MUSKEGON, MICH.

FACTORY REPRESENTATIVES:

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122 S. Michigan Blvd.,
Chicago, Ill.

L. D. Bolton,
1810 Ford Building,
Detroit, Mich.

MERCURY TRUCKS

When the mercury is up, the **Mercury** runs.

When the mercury is down, the **Mercury** runs.

Heat, cold, rain, snow, sleet, ice, the **Mercury** never changes.

The Commercial Motor Wagon that never varies.

Manufactured—not assembled.

The Mercury Manufacturing Co.
4108 S. HALSTED ST., CHICAGO, ILLINOIS

Please mention the "Power Wagon" when writing to advertisers.

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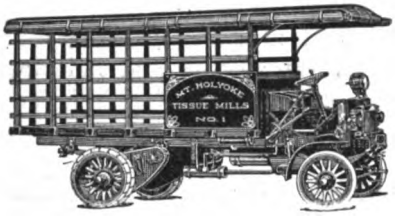
Knox

Commercial Vehicles

have enjoyed the reputation as *America's highest standard of Motor truck design and construction for over 12 years.*

Send for commercial or fire vehicle catalogs.



Some desirable territory open for first class agents

KNOX AUTOMOBILE CO., SPRINGFIELD, MASS.

BRANCHES:

NEW YORK CHICAGO

Will You Let Gramm Truck Owners Tell You About Gramm Service?

Figured down to the essentials, pretty nearly everything is sold on the strength of testimonials.

And by that we mean the good word of the man who knows, whether that be oral or verbal.

We're mighty proud of the volume of that good word, in our case. It's our biggest asset.

From all over this country—and from some foreign lands—we have received enthusiastic reports of Gramm service,

These good reports are backed up by Gramm re-orders.

We have had a greater percentage of re-orders than any other motor truck company in America.

One reason, of course, is the fact that the Gramm was the pioneer power truck.

We produced successes years before other companies began experiments.

Write us today—tell us your needs; we'll prove to you how we have helped others in similar circumstances.

The Gramm is made in 1, 2, 3 and 5-ton models.

The Gramm Motor Truck Co.

111 So. Lima Street, Lima, Ohio

Knickerbocker Trucks

Any mechanical part may be removed on the road in a half hour or less without unloading or dismantling the truck.

Write for Catalogue.

Knickerbocker Motor Truck Mfg. Co.

151st Street and River Avenue

NEW YORK

HARRISON

The Tubular Truck Radiator shown below is one of the many styles we manufacture, and they are all giving universal satisfaction under the severe conditions incident to this service. In fact, we have yet to hear of a failure, either as to efficiency or stability.

This stability is due to a minimum of PARTS AND SOLDERED CONNECTIONS—we have one seam for each seven tube element.

It is also due to use of the very best material and workmanship.

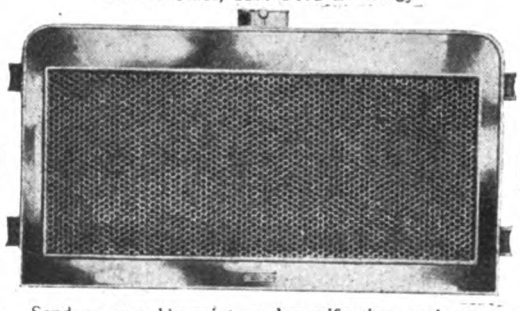
The efficiency is owing to free circulation of water, and high impingement of air.

We also manufacture cellular and tubular radiators for pleasure cars.

THE HARRISON RADIATOR CO.

LOCKPORT, N. Y.

Detroit Office, 1422 Ford Building,



Send us your blueprints and specifications and we will be pleased to estimate on your requirements.

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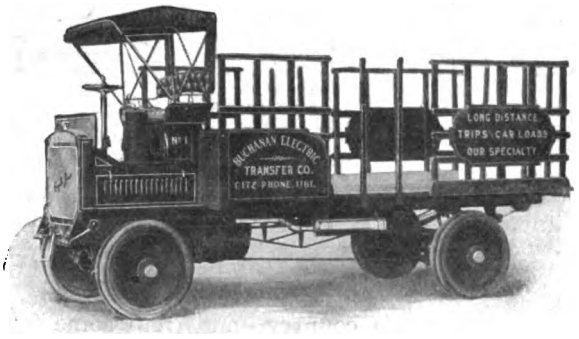


BUILT in Two and Three Axle equipments. 3½ to 10 ton capacities. Especially adapted for long hauls and difficult road problems.

Let us send you literature and full information

Couple-Gear Freight-Wheel Company, 550 Buchanan Street, Grand Rapids, Michigan

THE

POSITIVE

Positive Plain

Lock Washer

Made in all sizes and weights for Automobile purposes and Trucks or Power Wagons. Can be used thinner than any other lock washer—effective, no matter how thin. One lock under the nut and head can be used if so desired. Exhaustive tests, covering a period of nearly 20 years on railroad track, drop presses, Automobiles and machinery subject to vibration, have proven its superiority over every nut lock manufactured. *Write for samples and prices.*

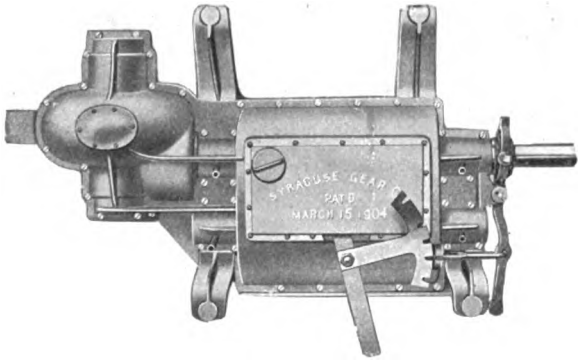
The original and genuine Positive Lock Washers are made *only* by the

POSITIVE LOCK WASHER CO.
NEWARK, N. J.

Syracuse Transmissions

PATENTED MARCH, 1904

Progressive and Selective Type Commercial Success for 10 Years



No. 4 Side Chain Drive, 2 ton Trucks
No 5 Side Chain Drive, 3-5 ton Trucks
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No. 80 and No. 15, Shaft Drive.
Also Planetary gears.

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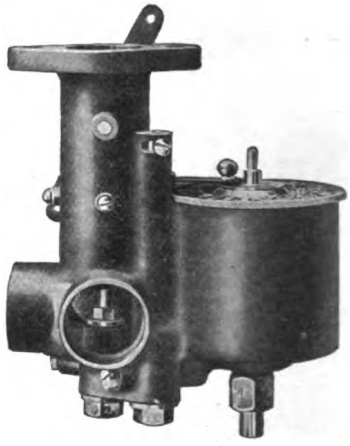
A CARBURETOR Absolutely Fool-Proof



THE Zenith Carburetor Company offers truck manufacturers and owners a carburetor proved by five years experience in Europe—absolutely fool-proof and without a single adjustment.

A trial will convince you of its power, its economy and its remarkable efficiency.

Zenith Carburetor Co.
270 Jefferson Avenue DETROIT, MICH.

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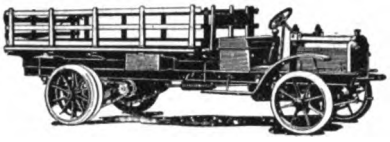
WHITE *Motor* TRUCKS



WHITE Motor Trucks are used by the leading mercantile and manufacturing firms throughout the country, in more than one hundred and fifty different lines of service.

White Trucks are selected on account of strength and simplicity of construction, ease and economy of operation, and reliability and long life in service.

The White Company
CLEVELAND

Manufacturers of Gasoline Motor Cars, Trucks, and Taxicabs

BOSCH

Nearly A Million

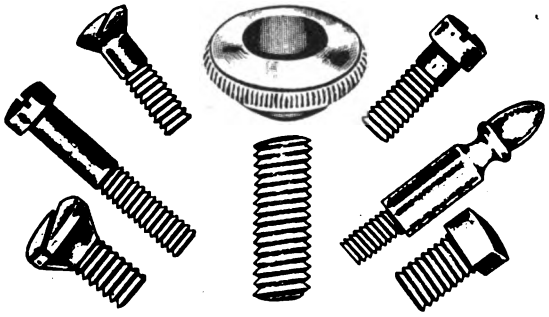
satisfied users of Bosch Magnetos have proven their value.

Bosch Magnetos and Spark Plugs constitute a fool proof, indestructible and long-lived ignition system that experience has taught, is especially suitable for the peculiar conditions met in the motor truck field.

Be Satisfied ***Specify Bosch***

Be sure you receive The Bosch News for March

BOSCH MAGNETO COMPANY
223-225 West 46th Street NEW YORK
Detroit Chicago San Francisco Toronto



Small Manufacturers

Don't tie your capital up in Screw machines—turn this class of work over to us.

We can do it quicker and cheaper for you and guarantee accuracy.

We are also prepared to do all kinds of machine work, hardening, tempering, grinding, polishing, plating and enameling.

Send blue prints for estimate.

National Cycle Mfg. Co.

Bay City, Mich.

GAYLOR-ATLAS

GRIPS FOR SOLID TIRES

ARE

Efficient in service
Easily and quickly attached
Simple in construction
Self-adjusting to rims
Harmless to tires
Made of Chrome Vanadium Steel
Extremely durable
Guaranteed against defects
For single and dual type tires
Needed all the year 'round
Inexpensive.

ARE NOT

Heavy and cumbersome
Noisy
Complicated in construction
For Winter use only
Hard to attach.

A Set in the Tool Box Guarantees Your Delivery Service

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Atlas Chain Co.

BUSH TERMINAL
BROOKLYN, N. Y.

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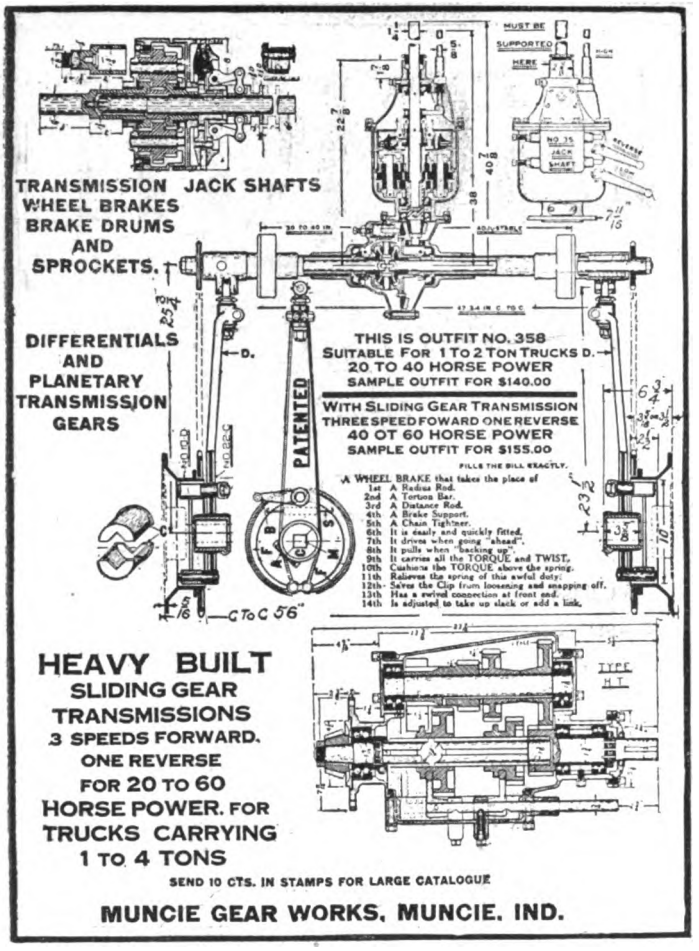
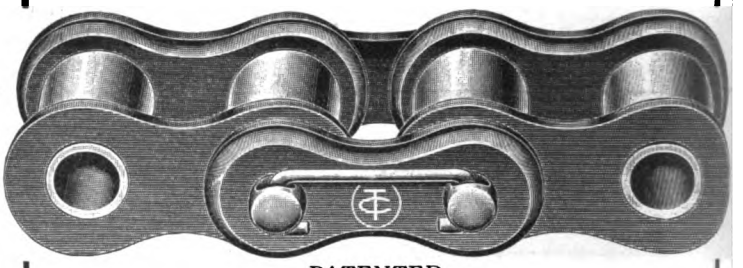


HEAVY BUILT
SLIDING GEAR TRANSMISSIONS
3 SPEEDS FORWARD.
ONE REVERSE
FOR 20 TO 60
HORSE POWER. FOR
TRUCKS CARRYING
1 TO 4 TONS

SEND 10 CTS. IN STAMPS FOR LARGE CATALOGUE

MUNCIE GEAR WORKS, MUNCIE, IND.

Culver-Taylor Detachable Chain



PATENTED

Designed Especially for MOTOR TRUCKS

The Notch Does It

A Detachable Chain with links that will not work loose. TRY THEM. The result will surprise you.

Culver-Taylor Chain Works

142 Madison Avenue, DETROIT, MICH

SPLITDORF MAGNETO

"Always There"

With the installation of SPLITDORF IGNITION—SPLITDORF SERVICE is at your command.

And SPLITDORF SERVICE is courteous and thorough and practical—from the factory and main distributing center in New York, through every branch office and other selling artery all over the country, to the crowning detail of personal road men.

And these road men—experts in their calling and human in their intelligence—have one duty to perform and that duty is to give their services to every SPLITDORF user for the asking.

If there is any "kink" in your ignition system—if it is not "right up to the mark" let SPLITDORF SERVICE straighten it out for you.

Your satisfaction is our satisfaction; so don't be afraid to call upon us.

Write for Catalog

C. F. SPLITDORF

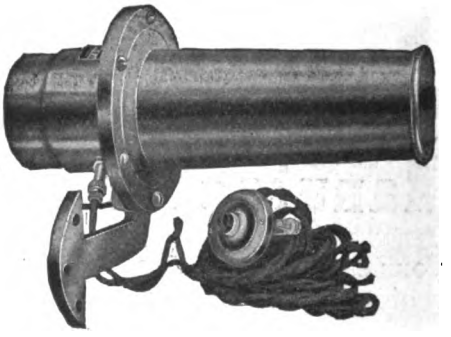
Walton Ave. and 138th St.

Branch, 1679 Broadway **NEW YORK**

CHICAGO BOSTON LOS ANGELES
DETROIT KANSAS CITY SAN FRANCISCO

NEWTONE

The Mile Away Electric MOTOR HORN



Torpedo Type

Pat. Sept. 5, 1911

PRICE

$20.00

Including Button and Cable

The Most Perfect Warning Device on the Market

The increased demand for the Newtone Motor Horn is due to its absolute efficiency in warning, and economy in operation.

The motor with Hess-Bright Ball Bearings and imported self-lubricating brushes, eliminate all oiling and cleaning.

The chief engineers of three leading American automobile manufacturers after a "Break-down" test, state that, in their opinion, the Newtone Horn is the best warning signal made.

Let Us Send One On Approval

Automobile Supply Mfg. Co.

220 Taaffe Place, Near Dekalb Avenue, **Brooklyn**

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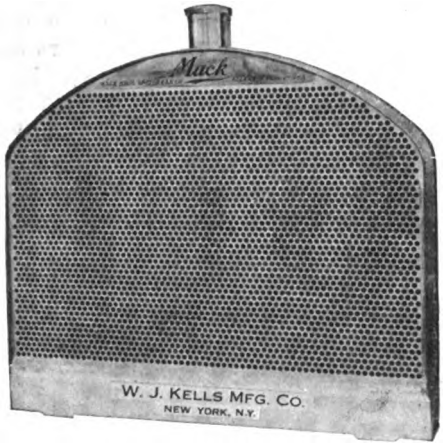
"KELLS"

The most Durable and Efficient

RADIATORS for Commercial Cars



Positively guaranteed not to leak for two years.
Used on all the **Leading Gasolene Trucks of America.**

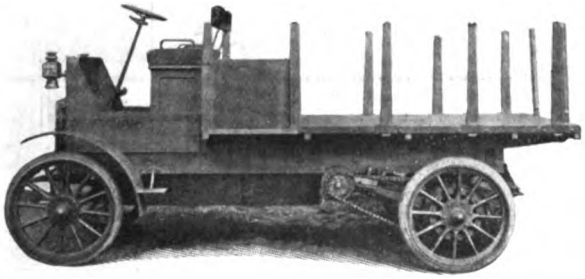
Ten Years Test Has Proven the Best.

BEWARE OF IMITATIONS.

W. J. KELLS MFG. CO.
521-25 W. 45th Street, NEW YORK CITY

THE PARK DROP FORGE COMPANY
CLEVELAND

Our newly designed 1500 lb.—2000 lb.—3000 lb. capacity motor trucks are now ready for prompt delivery to merchants, buyers and dealers.



These models are of the most modern design, being equipped with long stroke four cylinder motors especially designed for truck service. The transmission is 50% more than ordinary rating, and its parts are exceedingly heavy and rugged.

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Ideal Auto Truck Company
Fort Wayne, Indiana

A Seitz 3-Ton Truck That Has Seen 3 Years' Service.

It Costs 70 Cents to $1.20 Each Day to Merely Keep a Horse

His "keep" costs over 100% of his worth. A good team costs at least $2 a day just for their "keep" and this cost runs 365 days a year. A SEITZ 3-ton truck will do the work of three such teams **and at much less cost.**

Our big catalog tells all about the SEITZ and its wonderfully simple DOUBLE FRICTION TRANSMISSION—how one lever controls everything, how it does away with both clutch and gears and has automatic change of speed without releasing power, how bearing pressure is neutralized, why it has more usable power—an interesting story that you ought to have if you are thinking of trucks. Just say "Send me your Catalog."

Seitz Automobile & Transmission Co.
219 Beecher Ave.' Detroit, Mich.

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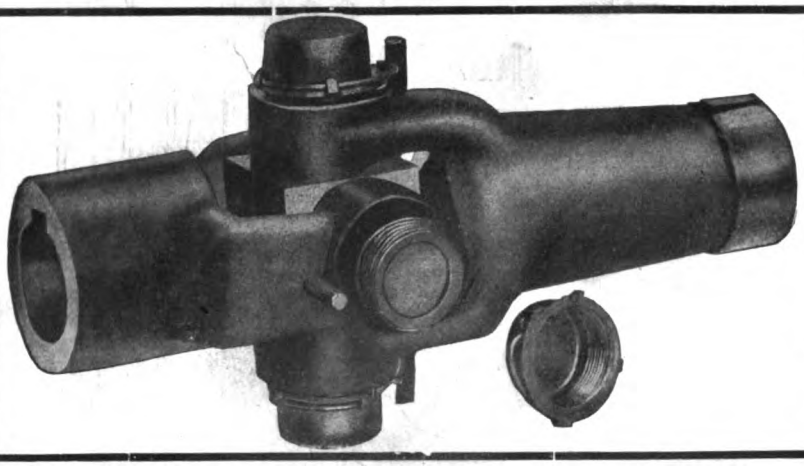


BLOOD BROS'. UNIVERSAL JOINTS

Style A, made for all sizes of shafts up to 3 inches.

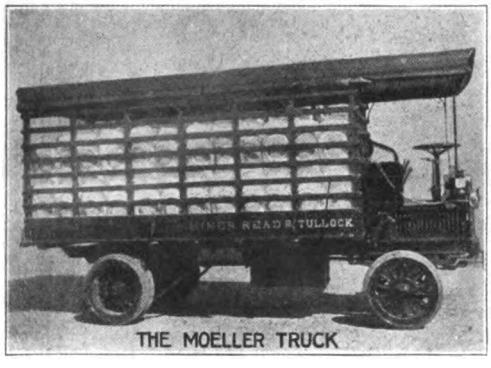
Strongest and most durable joint for motor trucks. Used for years as a regular equipment on many of the best makes of trucks.

BLOOD BROS. MACH. CO., Manufacturers
Kalamazoo, Mich.

TRUCK-SPRINGS

Auto-Trucks, Fire Apparatus and Commercial Vehicle Springs
combining
MAXIMUM OF ENDURANCE with MINIMUM OF VIBRATION
Made to order of Special Heat-Treated Alloy Steel

SPRING PERCH CO. Bridgeport, Conn.


THE MOELLER TRUCK

MOELLER Motor Trucks

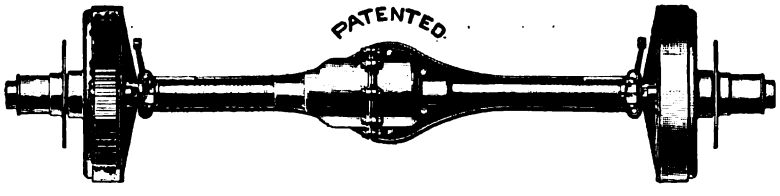
"A BUSINESS PROPOSITION"

Write for catalogue and literature today showing cost of operation and maintenance

Not a Better Built Truck in America

Manufactured and Guaranteed By
THE NEW HAVEN TRUCK & AUTO WORKS, New Haven, Conn.

Size, 1500 lbs. to 3 tons.



Size, 1500 lbs. to 3 tons.

Torbensen Internal Gear Truck Axle

Torbensen Gear & Axle Company

Bloomfield, N. J.

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WHATEVER BUSINESS YOU ARE IN --READ THIS LETTER!

Chas. W. Kohs
GROCERY AND MARKET
995 Kimball Ave., Chicago.

Dart Manufacturing Co. Waterloo, Iowa.

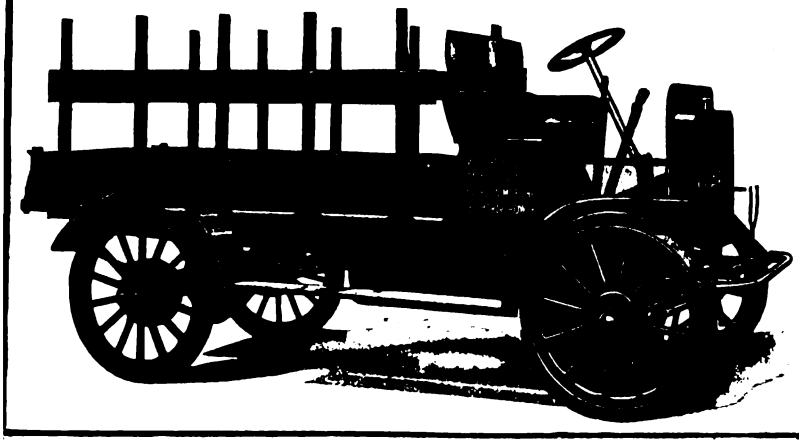
Have been running one of your Dart Wagons for nearly a year and am well satisfied with it, have had very little trouble but what I could fix myself, as I use it most every day for hauling home from Market and deliver my orders, when I get home. I think I have saved more than half what it cost me, as horse feed is high. Lost three horses before I bought a truck and took a chance to see if it would die, but it did not, run it all winter and never had to hang around a blacksmith shop half a day to get it sharpened, had it out in twelve below zero, and one of the worst blizzards that we have had in years yesterday.

Yours respectfully, Chas. W. Kohs.

A Dart Light Delivery will render the same service for you. If you are butcher, baker, grocer, confectioner, engaged in any business, learn how to increase it, your customers, your bank account. Full information and catalog sent upon request. Address

Dart Manufacturing Co., Dept W., Waterloo, Iowa

$650 COMPLETE
Other styles at equally attractive prices. Write for FREE BOOK.



The Clark Delivery Car

A specially designed one-ton capacity truck—not a "converted" pleasure car. Four cylinder, 30 h. p. motor. Full floating rear axle. Shaft drive. All moving parts enclosed and all parts interchangeable.

Send for illustrated catalog.

Clark Delivery Car Co.

Grand Crossing **CHICAGO, ILLS.**

Useful Information

¶ It is well known that the "Power Wagon" prints more useful information pertaining to mechanical road haulage than can be obtained from any other source, public or private.

¶ The accuracy and extent of this information is the result of seven years of specialized effort.

¶ If you are not a subscriber to the "Power Wagon" you are out of touch with much that would be of benefit you.

THE POWER WAGON

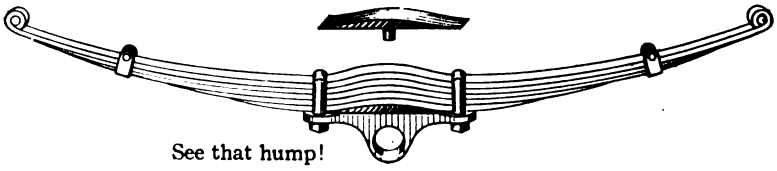
ESTABLISHED 1904

McCormick Building **CHICAGO**

TITANIC SPRINGS

Tougher than Vanadium—Cheaper than Vanadium

Neither NIB nor HOLE in center to hasten a break. Thirty years' experience enables us to make the best springs made. Let us be of service to you.



See that hump!

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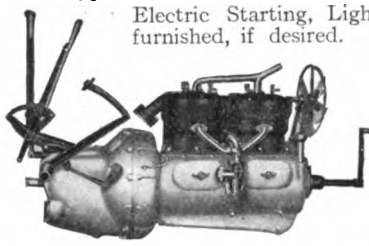

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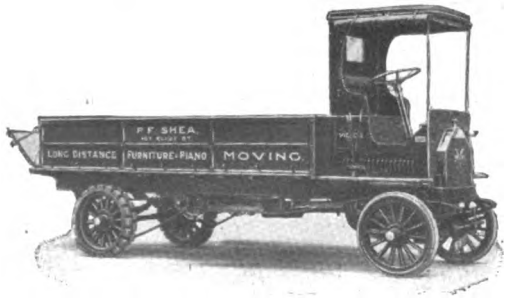
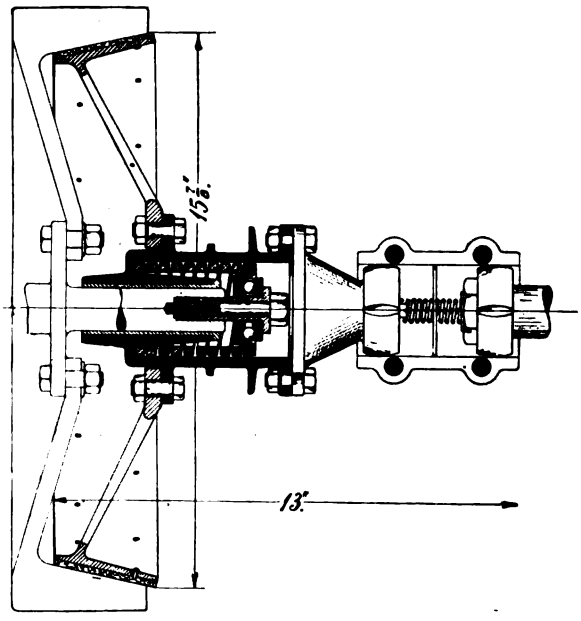


Victor Three-Ton Truck



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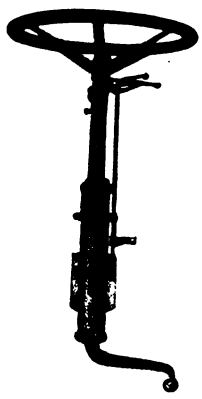

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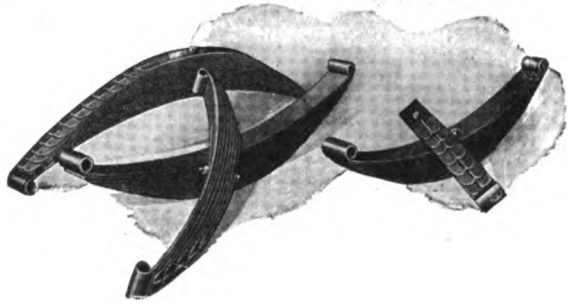

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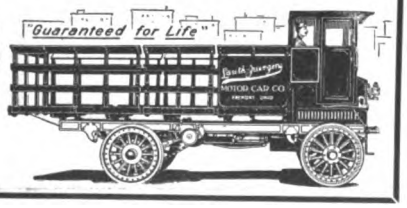

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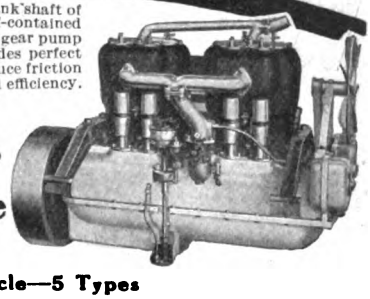

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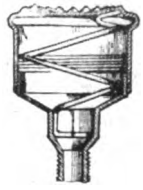

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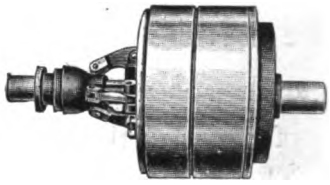

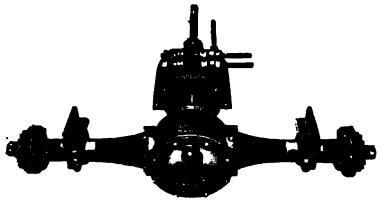

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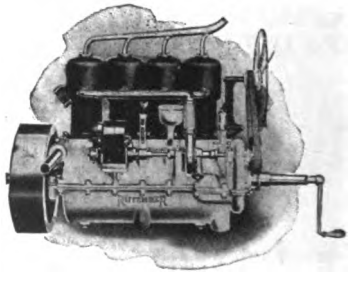

delivers the utmost power at the lowest unit cost. It has speed, endurance and silent efficiency. For economy of operation and repairs it has a record unequaled by any other commercial motor. Write for literature and list of trucks carrying the RUTENBER Motor.

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Manufacturers of

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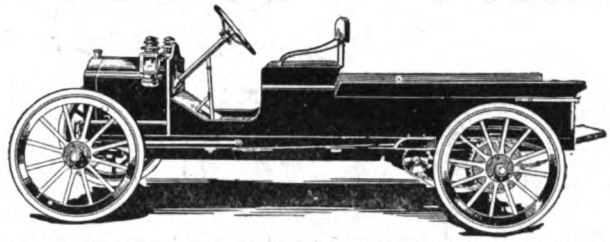

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An average of one-half the wind resistance of any radiator made.
The maximum of strength with the minimum of weight.
The only radiators in the world which may be frozen with no danger of splitting the tubes.

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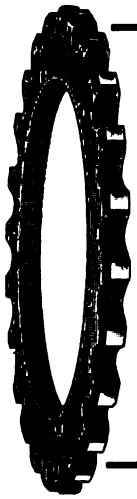

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"Whitney" Keys are made in 114 sizes and are furnished in three grades of steel, as follows:

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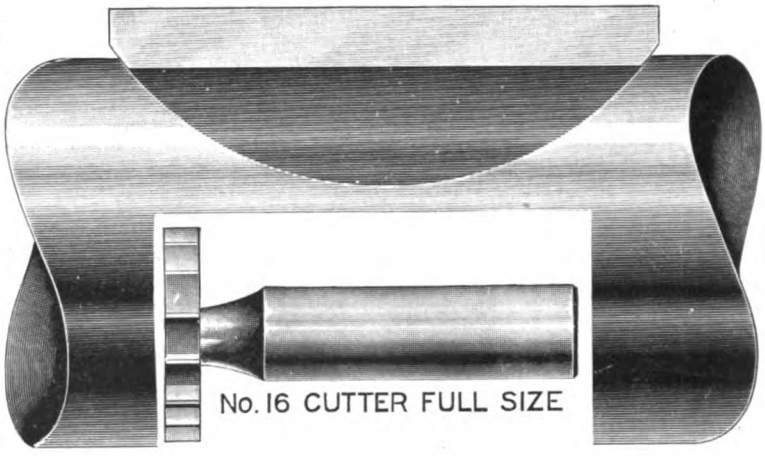
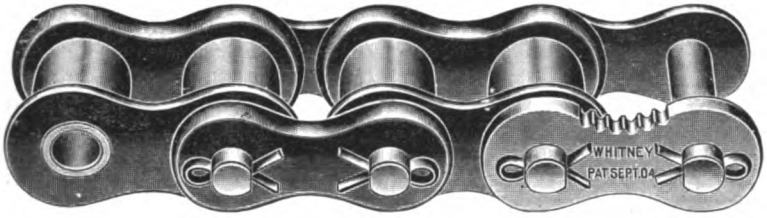


The "Whitney" Cotter Detachable Chain



Used and highly recommended by the leading makers of commercial cars.

When making replacements try a "Whitney" and get acquainted with its merits.

Look For The Cotter Pins.

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Detroit Oilers Prevent Waste

The Detroit Mechanical Force Feed Oiler gives **sure** lubrication under every condition.

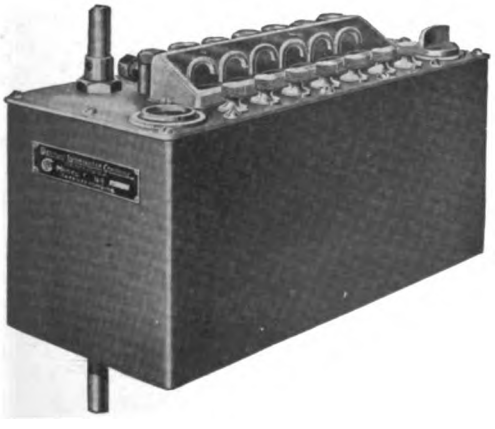
In connection with splash systems the Detroit maintains **exactly** the correct level at all times. At every changing speed the right amount of fresh, clean oil is supplied as fast as the oil is used up.

With the oil level in the crank case maintained at the proper height there is no opportunity for either under-lubrication or over-lubrication.

By preventing over-lubrication the Detroit Mechanical Force Feed Oiler eliminates **waste** of oil and its results—carbonized cylinders, pitted valves, fouled plugs and smoke at the exhaust.

Once properly regulated the Detroit Oiler takes care of itself and needs only an occasional replenishment of the oil supply in the reservoir.

The Detroit Force Feed Oiler gives a **complete** lubricating system for **every** kind of gas engine. It is efficient, economical and sure.



The Detroit Force Feed Oiler has no checks

The Detroit has no ball checks or check valves, springs or other complicated mechanism to get out of order and clog up. It guards against the damage, waste and expense resulting from faulty lubrication. It makes for guaranteed service.

Detroit Force Feed Oilers are made in capacities from two pints to five gallons, with from one to thirty feeds—pulley, rachet, sprocket or gear drive.

They are furnished as standard equipment by many manufacturers of high grade commercial trucks.

The Detroit catalog tells all about the advantages in design and construction which have made the "Detroit" the standard gas engine lubricator.

Write today for catalog P-67 and full information, stating in what kind of truck you are interested.

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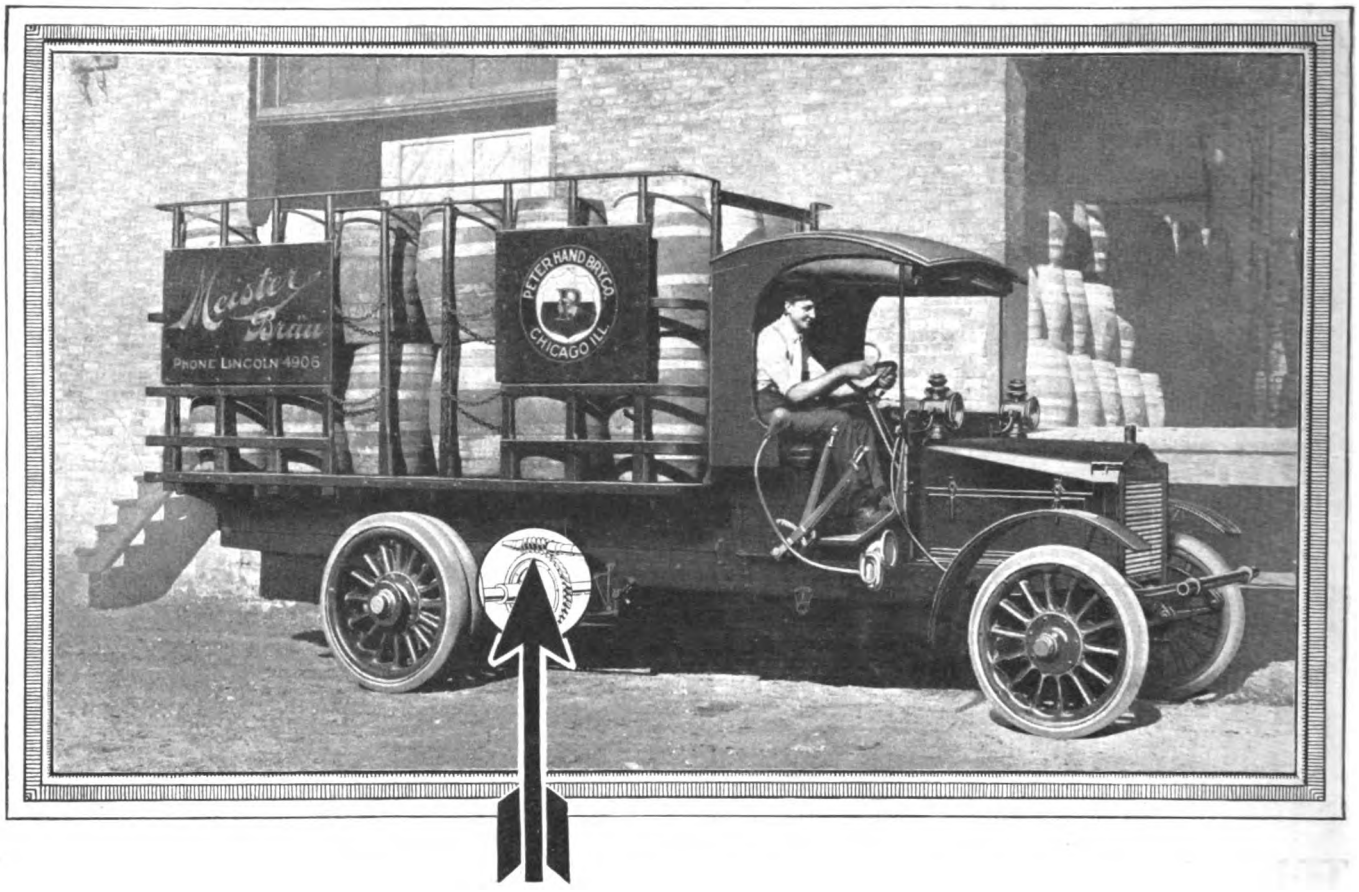

WORM DRIVE is the *accepted* motor truck drive in England—having succeeded other forms of gear reduction

This Unqualified Guarantee shows where the makers of the Pierce-Arrow Motor Truck stand in regard to *worm gear drive*:

> The worm wheel and worm shaft, generally known as worm gear construction, employed in the Pierce-Arrow Truck, are warranted to fulfill their functions for one year from date of shipment, under normal service.

Noise means useless expenditure of power. Silence means *utilized* energy. The silent worm drive means maximum efficiency, economy and durability.

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5-TON MOTOR TRUCKS

THE PIERCE-ARROW MOTOR CAR COMPANY, BUFFALO, N. Y.

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Motor Trucks

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The Alco today dominates the field in numbers produced and numbers sold.

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And 65 per cent of them are in the possession of companies rated by Bradstreet at one million dollars or over.

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Capital, $50,000,000

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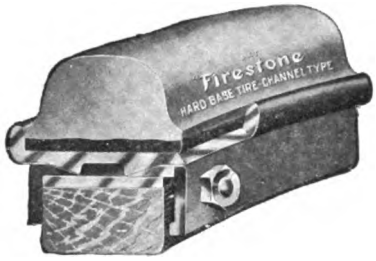
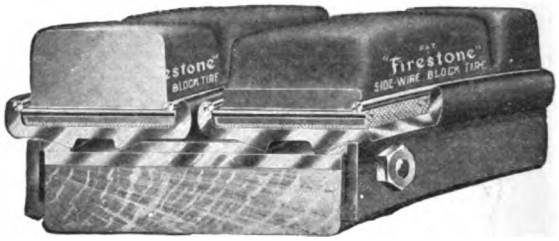
Two of the Six Fully-Proven "Firestone" Truck Tires



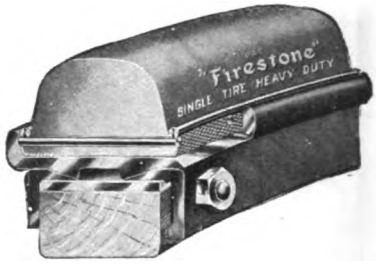
Hard Base—Channel Type
Furnished in Single or Dual Form



Side-Wire Block
Dual Form for Rear Wheels

Ten years' experience as leaders in motor truck tires is back of Firestone Truck Tires and Rims. Ten years of progress, step by step, has perfected them. Firestone, and not Firestone customers have paid for the experimental stage in all Firestone Tires and Rims.

We have a fully-proven tire for every Car, Load and Condition of Service. On regular rims or on Quick Removable rims for quick tire-changing *right on the spot.*



Hard Base—Channel Type

For resiliency in heavy service. This tire is vulcanized firmly into a channel with saw-tooth base. Consists of an extremely tough tread, cured to a hard rubber base.

The up-turned sides of the channel ensure the firmest possible base support against the tire working or tearing loose. Flat bands expand when in service, loosening the rim and tire; but the Firestone channel is too rigid to expand. At the same time it protects the rubber from side abrasion and allows it to wear down as long as there is enough left to give resiliency.

Side-Wire Block Tire

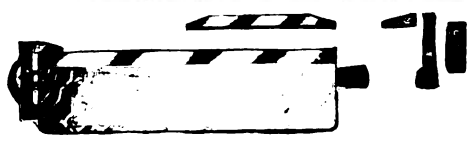
For traction, non-skidding and resiliency in heavy service. Has a continuous base, preventing abrasion from metal plates, as in other tires of this type. Worn or damaged blocks may be removed and new ones substituted without impairing the tire's strength.

Like the Hard Base—Channel type, it has all the advantages of Firestone quality of rubber.

Quick Removable Rim

Over two years in successful use. The original and *only perfected* one of its kind. Does away with vital weaknesses now in others. Accomplishes *in practice* just what we say *on paper:* "Enables the driver to make a quick tire-change right on the spot. Does away with lay-ups for tire-changes."

Write for full information and guarantees.



The Firestone Tire & Rubber Co., Akron, Ohio.

"America's largest exclusive tire and rim makers"

More Than 100 Service Stations for Truck Tires.

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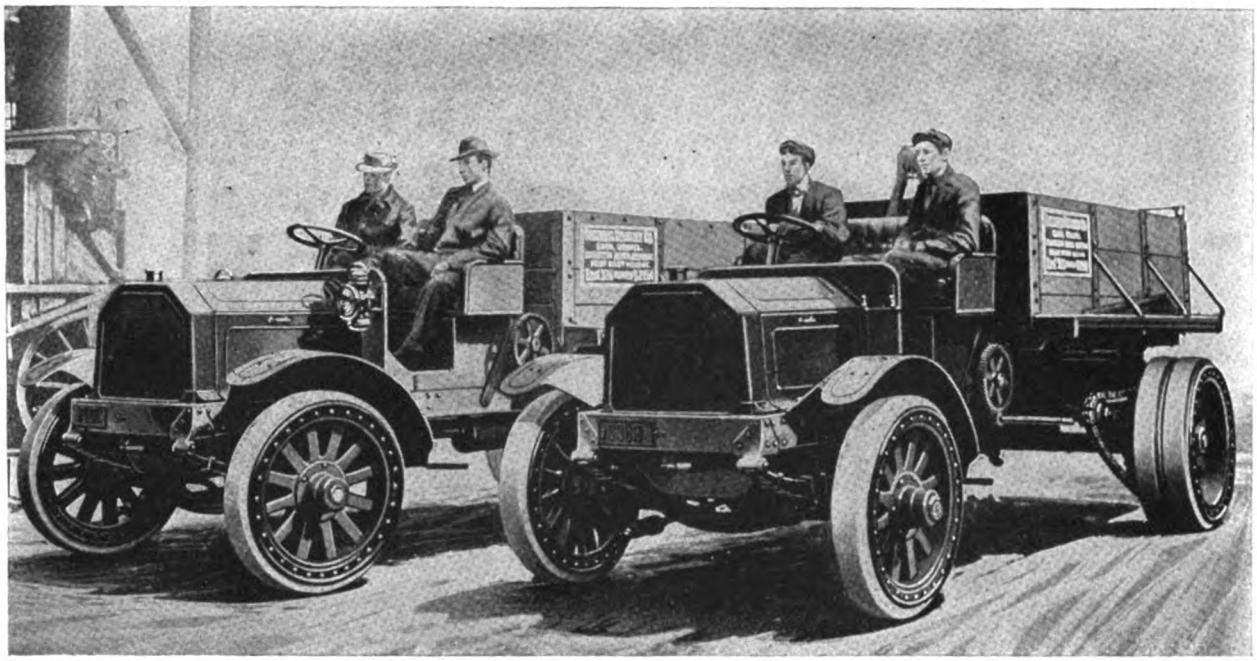

The first two 5-ton Peerless Trucks bought by the Columbia Contract Company, Portland, Oregon. Their performance has led to the purchase of seven other Peerless Trucks

BECAUSE of the powerful traction of the rear wheels, Peerless Motor Trucks have proved extremely efficient on the hills of Portland, Oregon.

The two Peerless Trucks illustrated above have been in service twenty-four hours a day, seven days a week, with drivers working in shifts.

Hauling materials from docks to construction-work in progress, their average daily mileage has approximated 115 miles.

The performance of these two trucks sold two other Peerless Trucks to the same Company; three to the Portland Sand Company; and two to the Portland Gas & Coke Company.

Peerless 3-Ton 4-Ton 5-Ton MOTOR TRUCKS

Correspondence with prospective users is invited—with the full assurance that purchase will not be recommended unless we are satisfied that Peerless Trucks will prove profitable to the user.

Truck Department
The Peerless Motor Car Co
Cleveland, Ohio

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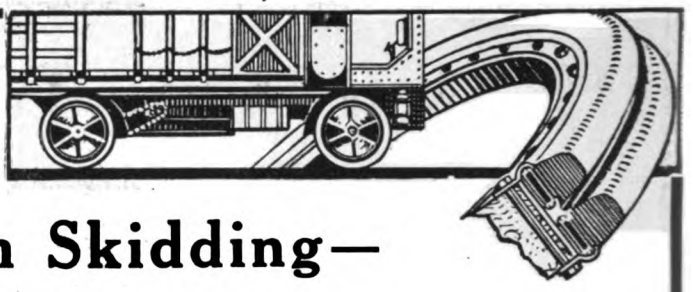

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Swinehart

Solid — Truck Tires — Cellular

SWINEHART Solid Tires—both types—possess quality to a degree that is putting them on more and more trucks each month in preference to others.

For heavy duty work, the **Swinehart Solid Type**—rubber from tread to base, without a core of metal or other hard material; with its short cross wires that hold it firmly in place and prevent creeping; and with its quick-attachable time-saving flange rim.

For high speed work, for resilience and the **most positive prevention** of **skidding without chains,** the **Swinehart Cellular Type**—the same in essential features as the solid but with perforated tread that gives it special advantages of its own. Investigate them for yourself.

Branches and Distributing Points

The Swinehart Tire & Rubber Co.—New York City, 1924 Broadway; Chicago Ill., 1720 Michigan Ave.; Philadelphia, Pa., 320 N. Broad St.; Boston, Mass., 727 Boylston St.; Detroit, Mich., 286 Jefferson Ave.

Keaton Vulcanizing Co.—San Francisco, Cal., 616 Van Ness Ave.

Gessler-Williams Tyre Co.—Denver,, Col. 1312 Broadway.

Rambler Auto Co.—Jacksonville, Fla.

Schofield Auto Co.—Macon, Ga,. 521 Popular St

Davenport Rubber Co.,—Davenport Iowa, 430 W. 3rd St.

B. F. Fitch—Louisville Ky., 444 S. 3rd St.

Tri-State Rubber Co. — Minneapolis,, Minn , 1017 Nicollet Ave.

The Swinehart Tire Co. — St. Paul, Minn., 142 W. 5th St.

The Long Rubber Co.—Kansas City, Mo., 1813 Grand Ave.

The Schelp Budke Tire & Rubber Co. — St. Louis, Mo,, 3454 Lindell Ave.

Andrew Murphy & Son — Omaha, Neb., 1410 Jackson St.

Empire State General Vehicle Co. — Rochester, N. Y., 15 Circle St.

Kane Motor Supply Co.— Buffalo, N., Y., Ellicott and Tupper Sts.

Asheville Auto Co.—Asheville, N C.

Relay Mfg. Co.—Charlotte, N. C.

Cleveland Rubber & Supply Co.— Cleveland, Ohio, 1907 Euclid Ave.

Acme Rubber Co.—Toledo, O., 925 Jefferson Ave.

G. B. Schulte Sons Co.—Cincinnati, Ohio., 716 Main St.

West Coast Supply Co. — Portland, Ore., 326 Burnside St.

Lange Motor Truck Co.—Pittsburgh, Pa., 145 S. St. Clair St.

D. H. Burroughs — Providence, R. I., 27 Washington St.

Jenkins Auto Specialty Co.—Sumter, S. C.

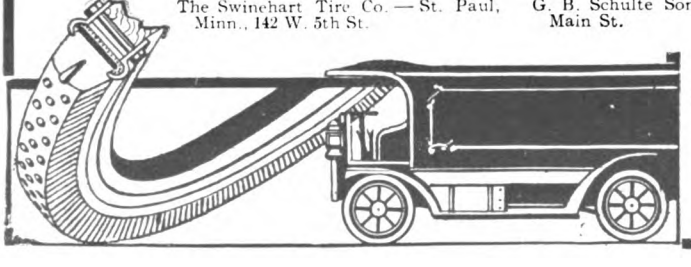
Standard Vulcanizing & Tire Co.—Nasaville, Tenn., 912 Broadway.

Six Thirtv Eight Tire & Vulcanizing Co. — Memphis, Tenn., 22 South 4th St.

Reid Auto Co.—Ft. Worth, Texas, 9th and Commerce Sts.

Monarch Motor Co.—Salt Lake City, 139 E. 2nd South St.

Franklin Auto Supply Co.—Milwaukee, Wis. 321 4th St.



The Swinehart Tire & Rubber Co.

1200 North Street, AKRON, OHIO

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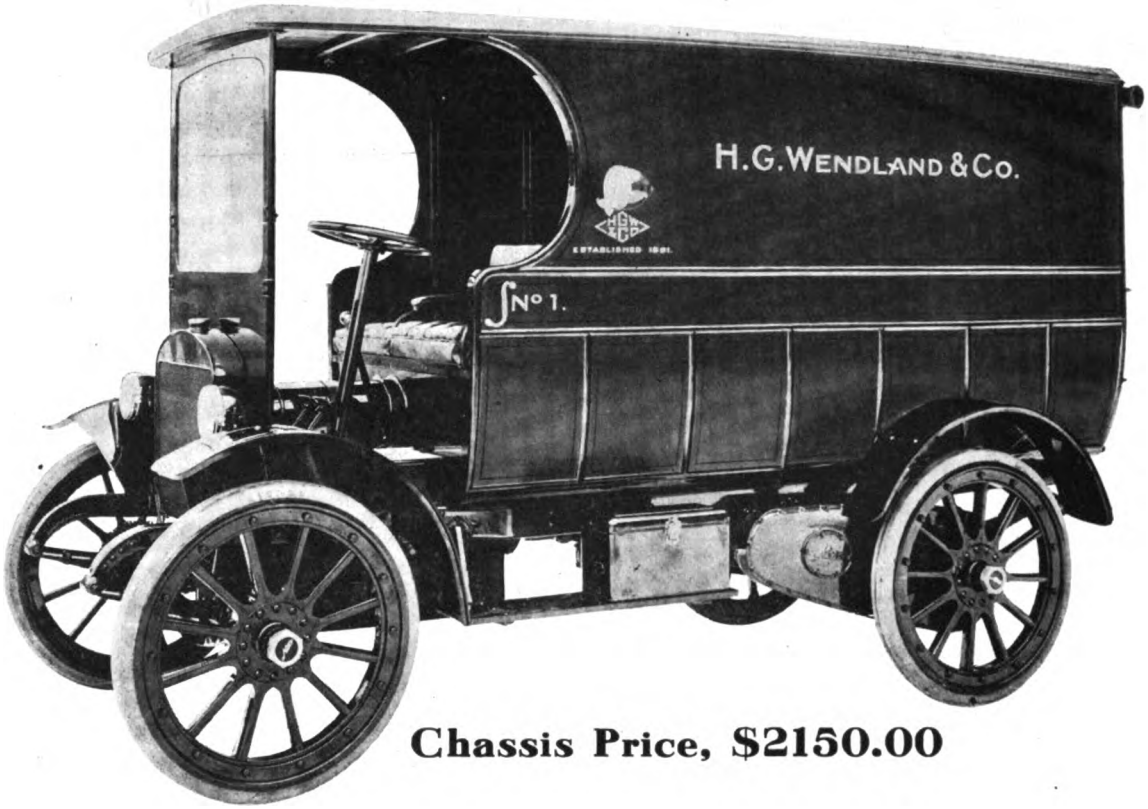
"Natco" One-Ton Delivery Truck



Chassis Price, $2150.00

General Specifications: Wheel Base—104 in. Motor—4 cylinder, 3½ in. bore, 5 in. stroke. Change Gear—Selective Type, three forward speeds. Power Transmission—Side chain drive, chains encased. Left side drive. Central control. Tires—Quick detachable, 36 in. by 3½ in., front and rear. Weight of Chassis, 2,600 lbs. Length over all, 14 ft., with 8 ft. pay load body. Transmission and Countershaft mounted on F. & S. heavy duty type annulars. Axle Bearings—Timken.

Natco Trucks are MANUFACTURED Not Assembled

74% of every **Natco** Truck is built entirely in our own factory, where we have direct supervision over all operations from the raw material to the finished article.

Engine, Clutch, Transmission, Chain Cases, Axles, in fact, every vital unit upon which efficiency depends is made in the National factories by National methods, which have an international reputation.

Neither is the Natco Design assembled. It is the result of actual knowledge of service, field conditions and requirements covering a period of fifteen years in both England and America.

We Could Have Assembled Trucks, but we preferred to make use of our commercial experience both in the motor truck and general manufacturing fields, produce trucks which we knew to be superior, and rest judgment on actual results accomplished by **Natco** users.

We Could Have Adopted the general design of motor-in-front rather than the motor-under-deck type, but had we done so, we could not have secured equal disposition of weight, shorter steering radius, increased tire mileage, could not have relieved the rear springs, wheels, bearings and tires of excess strains due to long rear overhang, could not have produced a truck which occupies the smallest amount of space while standing at loading platform, on the street or in the garage.

We Could Have Installed a Larger Motor, but why equip a car with excess power which cannot be utilized to commercial advantage? Excess power can result only in overspeeding, increased tire expense, and short life of all mechanism.

We Could Have Reduced Cost of Construction by eliminating the oil tight chain case, but had we done so, the owner would pay the cost of two or three cases per year in the replacement of sprockets and chains, and what is more important, the motor efficiency would be decreased from 10% to 30%, due to elongation of exposed chains, change of pitch diameter of sprockets and disalignment of countershaft and rear axle.

We Could Have Effected Considerable Saving by substituting a cheaper bearing throughout transmission and countershaft for the more expensive imported annulars, but, in order to conserve power, maintain perfect alignment, and follow out in every detail harmonious construction, we could only adopt the highest type of anti-friction bearing.

"What You Get for Your Money Is as Important as the Amount You Pay." Investigate Before Purchasing.
Send for Catalog. Desirable territory open for responsible agents with adequate service facilities.

National Motor Truck Co.

Under same management as National Cycle & Mfg. Co.

Bay City, Michigan

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The Real Test of Truck Tires

The Real Test of Truck Tires

is not service on smooth, well kept main thoroughfares—the real test is service around warehouses, depots, terminals and wharves where pavements are always at their worst.

Diamond Wire Mesh Base (Spliceless) Truck Tires are built to *give Mileage and Service under all conditions.*

A rugged tire that absorbs and distributes the terrific shocks of the impact of a heavily loaded truck on the roughest pavements and the only solid tire that does so.

A one piece (spliceless) tire, correct in design, and the largest selling solid rubber motor truck tire in America—that's the Diamond Wire Mesh Base Truck Tire.

Write for our book "The Profit Side of a Motor Truck"

The Diamond Rubber Company

AKRON, OHIO

Diamond
WIRE MESH BASE
TRUCK TIRES

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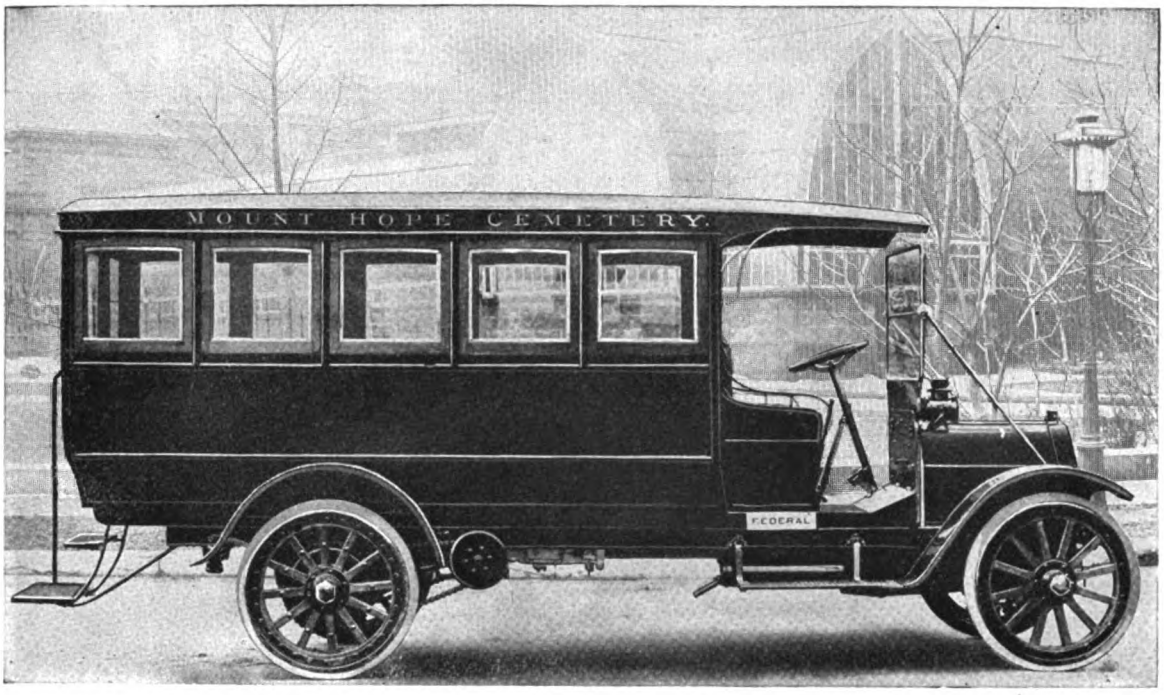
Wherever Quality Counts



A Federal Omnibus in operation at Mt. Hope Cemetery, Chicago. Capacity, eighteen passengers.

Federal one-ton chassis, including seat, $1,800. Body type at purchaser's option. Wheel-base, optional, 110-inch or 144-inch. Motor, 4 cylinder, 30 H. P.; Magneto, high-tension; Clutch, 16-inch cone; Transmission, three speeds forward and reverse; Hyatt high-duty bearings; Tires, solid, 36x3½-inch front and 36x4-inch rear.

This Demonstrates Again the Versatility as Well as the Unequalled Efficiency of

THE FEDERAL

The Logical Solution of Every Transportation Problem
The Logical Choice for Every Service

The Directors of Mt. Hope Cemetery selected the Federal from a score of trucks to perform this service—

ONE-TON TRUCK $1800

And at the same time, buy a one-ton bus that is the acknowledged standard of efficiency, reliability and economy in gasoline transportation.

BECAUSE—
The Federal chassis is rigid, staunch and, with the 144-inch wheelbase, has a short turning radius.

BECAUSE—
The Federal motor is powerful, durable, reliable and economical.

BECAUSE—
The Federal—at $1800—is preeminently the cheapest as well as preeminently the best standard one-ton truck on the market.

The directors of Mt. Hope Cemetery, shrewd, conservative business and professional men, realized that by buying a Federal bus they could save between $400 and $500 for their stockholders.

To the merchant and manufacturer who have delivery problems we can offer no better argument than this testimonial of the directors of Mt. Hope Cemetery.

Today, the Federal at $1800 leads all one-ton trucks by a year in price, excellence and reputation.

Our huge new factory, the huge demand for Federal trucks, the preeminence of the Federal have confirmed the soundness of Federal principles and ideals.

And the results of our success go back into the Federal one-ton truck.

With every Federal goes a guarantee of a maximum service and quality for a minimum of investment and up-keeping cost.

FEDERAL MOTOR TRUCK COMPANY

New Factory, Leavitt and Campbell Avenues, Dept. C, Detroit, Mich.

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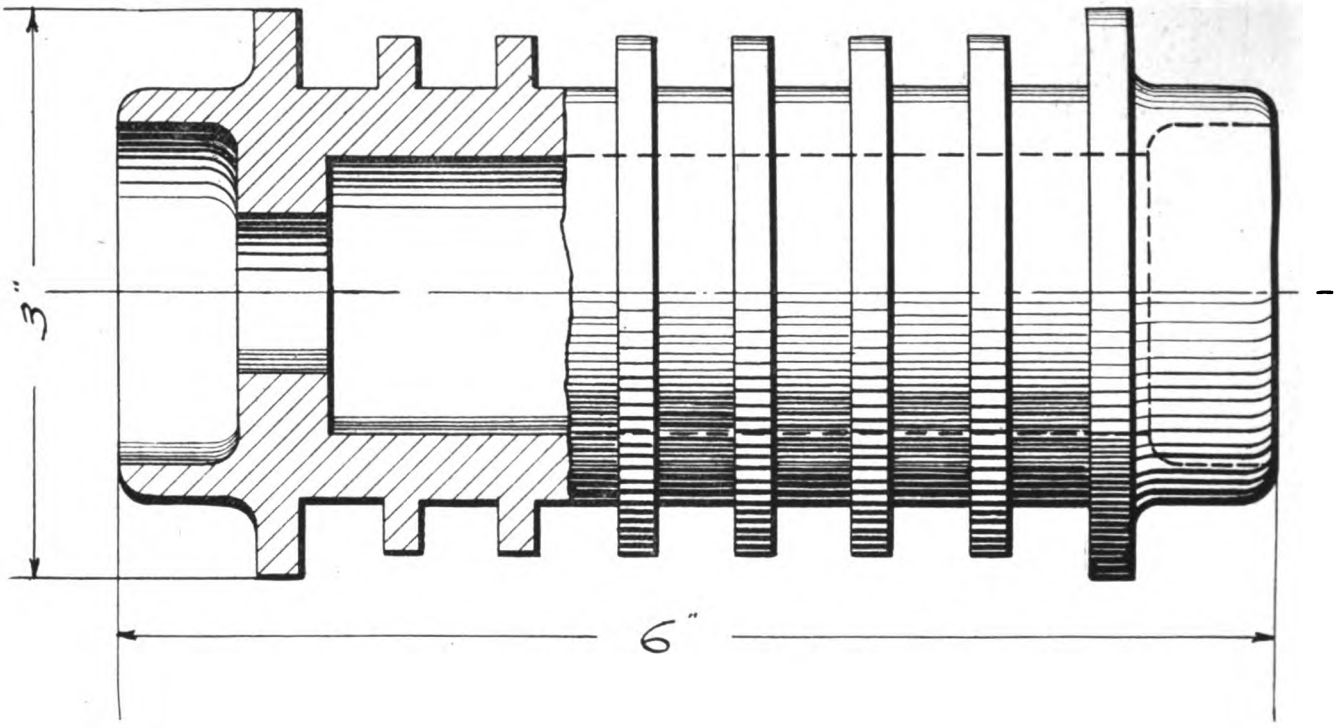
THE TIME SAVING

that can be effected with the "Cleveland" Automatic is hardly believeable until you have an actual demonstration of its efficiency. Nor is this the only advantage—the small labor cost and the accuracy of work turned out are equal factors in assuring a saving of from 25 to 50 per cent on production costs. It has a wider range than any other of the automatics, handles any shape or any sized piece, is simple in operation and more easily adapted to varying conditions than any other.

The piece shown below was finished on a "Cleveland"—all operations—in 25 minutes. Do you know a machine that can equal this?



Piece No. 549. Material, machine steel, made on a 3½" New Model Cleveland Automatic Turret Machine. Counterbore at rear end of piece, second operation. Time for all operations, 25 minutes.

Capacities of the Cleveland, ¼" to 6¾". Operating expense One Mill a Minute. Send us samples or drawings of your work and we will return complete specifications, explaining outputs, cost of machine, tools, etc.

CLEVELAND AUTOMATIC MACHINE CO.

CLEVELAND, OHIO, U. S. A.

Eastern Representative—J. B. Anderson, 2450 North 30th Street, Philadelphia.
Western Representative—Herbert E. Nunn, 562 Washington Boulevard, Chicago.
Foreign Representatives—Charles Churchill & Co., London, Manchester, Birmingham, Newcastle-on-Tyne and Glasgow. Alfred H. Schutte, Cologne, Brussels, Paris, Milano and Bilbao. Donauwerk Ernst Krause & Co., Berlin, St. Petersburg, Stockholm, Copenhagen, Austria-Hungary and the Balkan States. Andrews & George, P. O. Box 66, 242 Yokohama, Japan.

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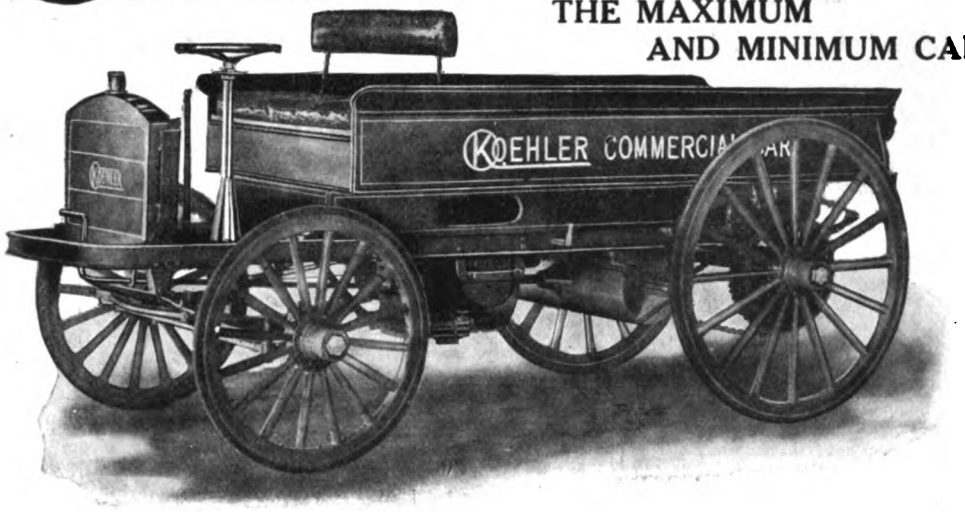
KOEHLER Commercial Car

THE MAXIMUM AND MINIMUM CAR



Capacity 1600 Lbs.

Price $750

Maximum Load Capacity for Minimum List Price

OPEN FLARE-BOARD TYPE

Large and Roomy—inside measurements 44 inches wide, 84 inches back of driver's seat to rear. Flare-board, 17 inches above floor. Strongly ironed throughout, also ironed to receive four-post canvas top, which can be had from stock at $40.00 additional. Suitable for general express work.

Carrying Capacity, 1600 lbs. Price, $750.
With Various Types of Bodies, the Prices Range from $750 to $900.

Why the KOEHLER Commercial Car is of 1600 Pound Capacity

The Koehler Commercial Car stands pre-eminent among commercial cars, because it is the result of years of practical experience. It is designed, developed and built by Mr. L. E. Schlotterback—the real big man of the industry.

Most commercial cars are adaptations of pleasure cars. This is not the RIGHT way to design a car that is to do heavy duty, 300 days—and nights if necessary—in the year. Mr. Schlotterback has designed every type of commercial car from 10-ton capacity downward. His business life has been connected with the solving of transportation problems—and the result is the KOEHLER COMMERCIAL CAR.

Mr. Schlotterback decided to specialize first on the size that would be most economical; secondly on the design that was best adapted to that size; and thirdly, to make the ONE car that everybody could use and drive. Such a car is the KOEHLER COMMERCIAL CAR.

Exhaustive tests were necessary. Mr. Schlotterback successfully determined the REAL COST of transporting merchandise in single, heavy loads under every conceivable condition. He found out which was the most reasonable method—whether merchandise should be delivered by a heavy truck to a given point and then reloaded on smaller trucks to be sent to their final destination—making two hauls—or whether it was more advantageous—whether it cost less—to use a number of small trucks to accomplish the same result.

His investigation proved conclusively that the cheapest and best method was—the smaller delivery wagon. He found that it moved quicker, and did just as much work at DECIDEDLY LOWER COST.

The next problem was—what capacity would further minimize transportation charges. Mr. Schlotterback made thorough investigations. He tried out the 500 pound load, 800 pound, 1500 pound and 2000 pound capacity—and he studied the figures and particularly the cost, carefully.

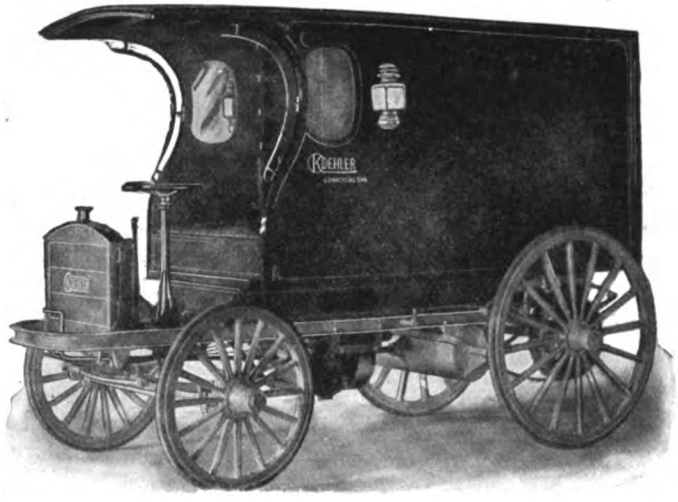
The results of exhaustive tests proved that the small car of 1600 pounds capacity is the logical car for this reason—1600 pounds is the most economical load to carry in order to obtain the right speed, the right haul at the right price per load.

That's Why the KOEHLER Commercial Car is of 1600 Pound Capacity

Adapted to Retail Merchants, Dry Goods, Laundries, Grocers, Butchers, etc.

SPECIFICATIONS

Motor—2 cylinder opposed, 22-24 H. P.
Cooling—Thermo-syphon system.
Ignition—Bosch High-tension Magneto.
Control—Left hand, throttle lever on steering column.
Drive—Direct line with jack shaft. Final drive from jack shaft to rear wheel sprockets through double side chains.
Transmission—Planetary type. All gears genuine chrome nickel steel, hardened throughout.
Brakes—Service brakes on jack shaft. Emergency brakes simple in design, extraordinarily powerful, operated independently.
Tires—2 in. Solid Rubber.
Capacity—1600 lbs.
Wheel Base—85 in.
Speed—4 to 16 miles per hour.
Price—$750 to $900, depending on body equipment.



PANEL TYPE B, $150 EXTRA

Inside measurements, 42 inches wide, 53 inches from floor to top, 84 inches back of driver's seat to rear. Canvas side body similar in appearance to Panel type B—$800.

DEALERS: WE ARE READY

To assign territory to progressive dealers—dealers who are alive to the opportunity offered in handling a car that offers the best inducement to the prospective user—economy of operation—lowest first cost and lowest upkeep.

Address all Correspondence to

1709 Broadway, NEW YORK, N. Y.

"Built in Newark, N. J."

H. J. KOEHLER S. G. CO.

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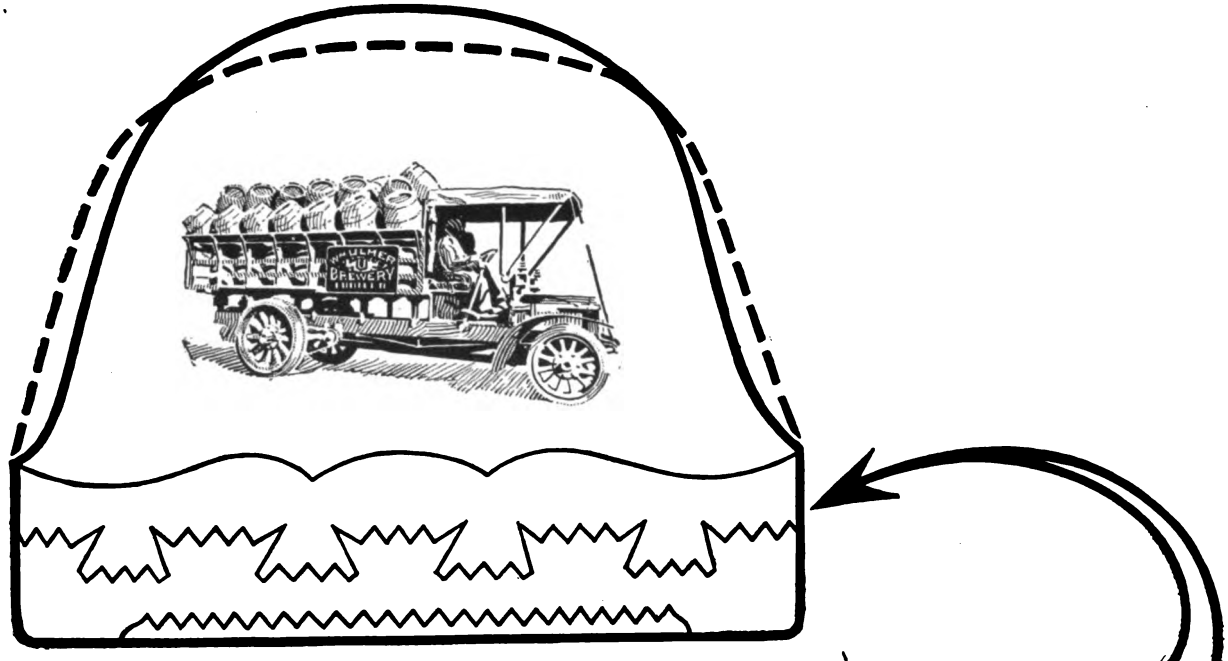

No breaks at the base

You are blinding yourself to a big item of possible tire cost if you do not consider the construction of the base. Two tires of different makes may each run 10,000 miles and yet one will cost **much more** per mile than the other.

The Goodrich "wireless" method of fastening tire to rim does away with all internal metal fastening devices. It absolutely prevents the tire from giving way at the base before full wear on the tread has been obtained; a frequent cause of sudden disability while truck is in service and consequent expense through "dead time."

This is **one** of the logical reasons why Goodrich Wireless Truck Tire stays on and gives 10,000 miles and upward of **uninterrupted** service. There are other reasons:

1: Tire and rim a perfect unit. The tire proper is built on a dovetailed steel base, into which the hard rubber sub-base is keyed—making sidewise movement impossible. A transverse key on the outer side prevents circumferential movement or "creeping."

2: The tire was scientifically patterned so that it would assume, under load, the shape that gives it the greatest traction and resiliency, without damaging distortion. (*Normal and load contours shown in outline illustration above.*)

3: The rubber compound of the tread is so tough that you can hardly stick a pin into it. Full wear on this tread means far more than "full wear" on the ordinary tire tread. It is a perfect combination of extreme toughness with resiliency.

Many imitations of the Goodrich Wireless are now springing up. But remember we were the *first* to bring out the steel base tire in America. The Goodrich is the *only* wireless tire that has been *perfected* to meet American conditions. The shape, quality of rubber, and the distinctive wave-line of contact between soft and hard rubber are *Goodrich* features. Buy the *original.*

TRADE MARK

The B. F. GOODRICH CO.,
AKRON, O.
Largest in the World
Branches in the Principal Cities **Wholesale Tire Depots Everywhere**

GOODRICH WIRELESS

Built on Steel TRUCK TIRES Wear like Steel

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KISSELKAR SERVICE

KisselKar service is nation-wide. Included in the KisselKar service organization are especially constructed and equipped service buildings at principal points of America. These are service branches of the Kissel Motor Car Company, bringing every KisselKar owner into close relationship with the manufacturer to whom *service* to *owners* is an important policy.

These branches carry a full stock of parts of every KisselKar model ever built, so the shaking loose and loss of minor parts, or even serious breakages through accidents, do not involve long waits for replacements. **KisselKar Service takes care of you wherever you are.**

Here is a partial list of KisselKar Service Branches and Sales Agencies:

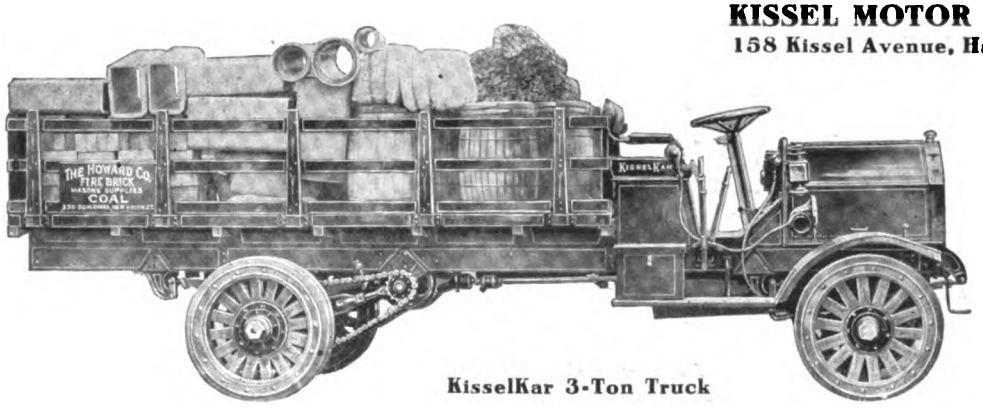
Boston, New York, Philadelphia, Cleveland, Detroit, St. Louis, Dallas, El Paso, San Antonio, New Orleans, Baltimore, Chicago, Milwaukee, Kansas City, Omaha, Butte, Denver, San Francisco, Los Angeles, Seattle, Portland, Minneapolis, Duluth, Buffalo, Pittsburgh, Hartford, Conn., New Haven, Albany, Troy, Montreal, Quebec, Toronto, Winnipeg, and 200 other principal points throughout the United States.

KISSELKAR TRUCKS

1 1-2 to 2 ton, 3, 4, 5 ton Trucks, Delivery Wagons, Fire Dept. Apparatus, Ambulances, etc.

Write for KisselKar Catalog, illustrating and describing the KisselKar line of truck and pleasure models. Gives comparative cost of horse and power haulage. It is one of the most comprehensive automobile books ever published.

KISSEL MOTOR CAR CO.
158 Kissel Avenue, Hartford, Wis.



KisselKar 3-Ton Truck

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TIRE TIPS

Summer is on its way and in purchasing tire equipment HEAT is the Factor to be considered.

The heat generated by a tire is the greatest Factor in its destruction. Continued Heat is Death to rubber.

Get rid of the heat by using a sectional tire.

Kelly-Springfield Sectionals

are "Air-Cooled" between sections.

They are ideal on hot asphalt roads; each section works for an instant—rests until its turn comes again.

They have plenty of room to expand lengthwise as well as laterally, thus giving double the resiliency.

KELLY-SPRINGFIELD Sectionals mean Economy in Tire Costs.

KELLY-SPRINGFIELD TIRE CO.

NEW YORK, N. Y., and AKRON, O.

BRANCHES— Boston, Mass. Atlanta, Ga. Chicago, Ill. Cincinnati, O. Cleveland, O. Philadelphia, Pa. San Francisco, Cal. Baltimore, Md. St. Louis, Mo. Los Angeles, Cal. Seattle, Wash. Detroit, Mich. Buffalo, N. Y.

Please mention the "Power Wagon" when writing to advertisers.

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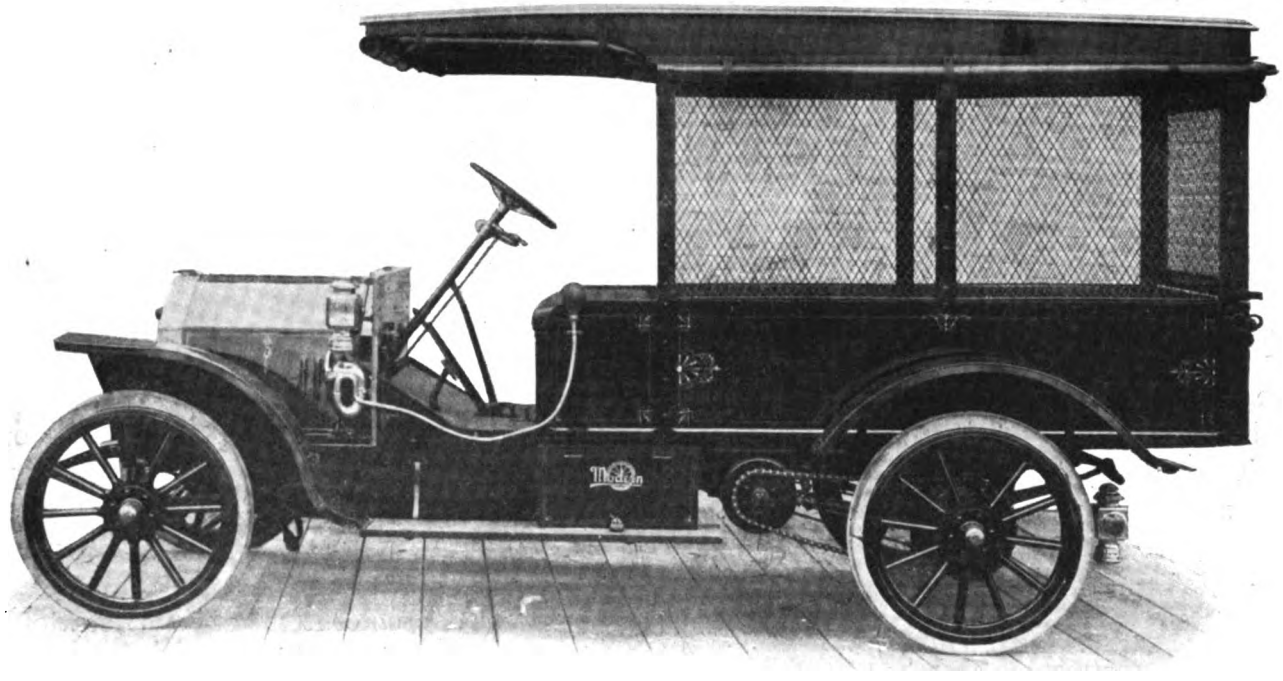
The True Value of a Motor Wagon Depends on its Freedom from Interruption of Service

The Modern is built on that idea

Tested in many lines of business----Strongly endorsed by users in every section

EXCEPTIONAL QUALITY OF DESIGN AND APPEARANCE



Capacity 1000-1300 Lbs. - - - Chassis, $1200
1500-2000 Lbs. - - - Chassis, $1600

PROMPT DELIVERIES

Dealers of highest standing are invited to inquire for territory, giving sales and service facilities.

Write for catalog

The Bowling Green Motor Car Company

Bowling Green, Ohio

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"Better late than never" is an old saying; "but better early than late" is the modern truism

J. L. G. & Bro. 5/1/12

GIBNEY WIRELESS

THE THREE-YEARS-AHEAD TIRE

THREE YEARS AHEAD! In 1909 we introduced the **GIBNEY** type of tire, which quickly proved its superiority. To-day most all tire makers are advocating this style of tire. Possibly you think that we make frequent reference to the fact that the **GIBNEY** type of tire is three years ahead of the times. We are justified in doing so, as it is a vindication that while we alone were willing to introduce and push this style of tire, we were nevertheless right, because universal imitation is proof of our claims.

A FEW more words from one of our many satisfied users. We hope some day to publish a letter from you in this column. If maximum tire service counts for anything, we will have that letter;

Extract from letter dated Nov. 10, 1911:

" . . . Your twin tires have given us very satisfactory service, lasting from nine months to a year. We are having a new 5-ton truck built which will be equipped with GIBNEY TWIN TIRES."

(*Signed*)

JOHN LANG PAPER CO.,
Philadelphia

Minimum Up-keep Cost

THE commercial car of to-day is a commercial proposition and must be considered as such by every buyer. As one of the chief items of expense is tires, one of the chief items of consideration is tires. If we can demonstrate to you that the **Gibney Tire** will give you greater mileage at less cost than any other make, you will want **Gibney Tires.** We can demonstrate this fact; hence we ask you to write us stating your requirements and we will proceed to give you prices and facts.

JAMES L. GIBNEY & BRO.

223 N. Broad Street, PHILADELPHIA **248-52 W. 54th Street, NEW YORK**

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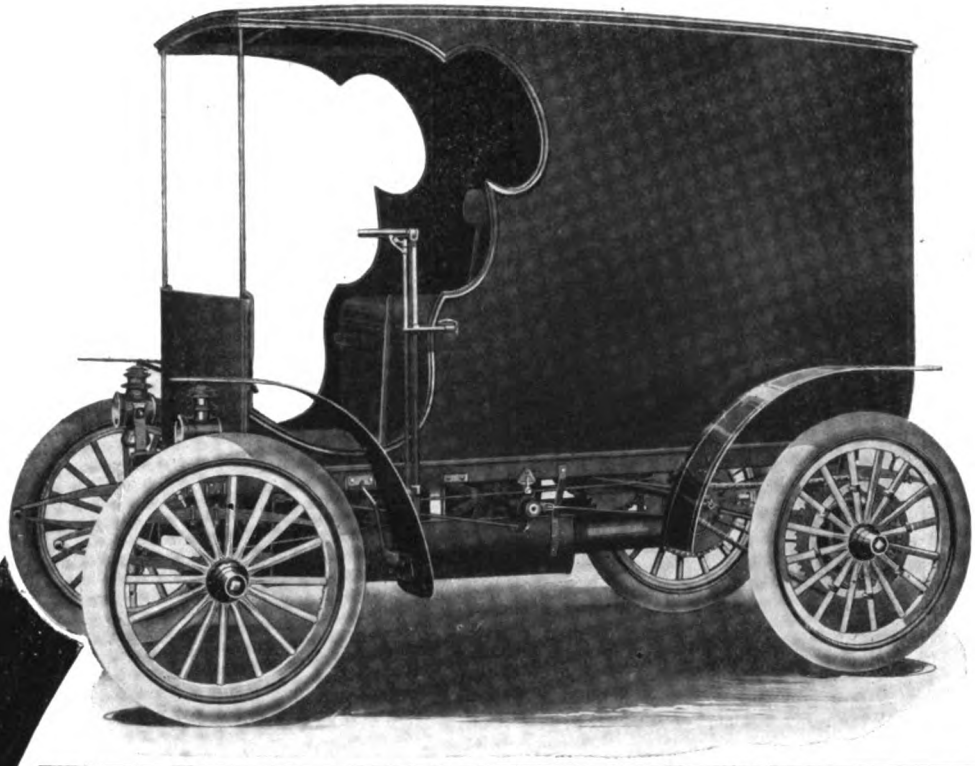
LINCOLN



LINCOLN

NO TIME LIMIT ON THE GUARANTEE

HAVE YOU INVESTIGATED?

Every agent who has investigated the Lincoln Motor Wagon has closed a contract. These agents are old at the business, and think more of their established trade than anything else. They constantly have their finger on the pulse of the buying public, and are in a position to know. Hear what they say:—

"I can sell 100 this season." "Your Lincoln Motor Wagon is the one I can do business with." "My customers want this wagon." "The price is right."

We build these cars to give service. They are strong, handsome in appearance, simple in construction, reliable, and money savers in point of upkeep.

$575.00 to $785.00

500 pounds to 800 pounds capacity

Panel top or open express bodies. Solid or pneumatic tires.

AGENTS WANTED IN OPEN TERRITORY. WRITE FOR TERMS.

Lincoln Motor Car Works

1347 West Harrison Street

CHICAGO, ILL.

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SHELDON

One-Ton Equipment

IT'S READY!

Consists of

Front Axle, I-Beam style, with spring pads forged integral.

Rear Axle, rectangular shape, with integral spring pads, brakes and radius rods.

Jack Shaft with Transmission.

Springs, and all necessary brackets, shackles, clips, etc.

This material is thoroughly tried out, and you can have a complete truck on the market in short order. What we offer you here has been tried and tested, not by the user alone, but by ourselves. Let us send Bulletins on all this material.

SHELDON AXLE CO.

WILKES-BARRE, PA.

Chicago Branch:
68 East 12th Street

Detroit Branch:
1215 Woodward Ave.

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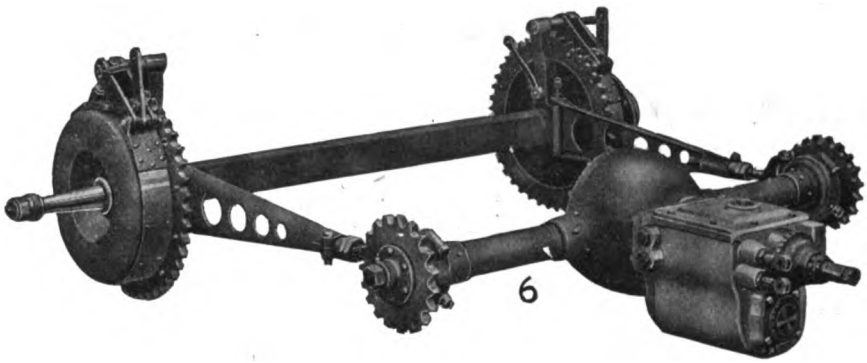
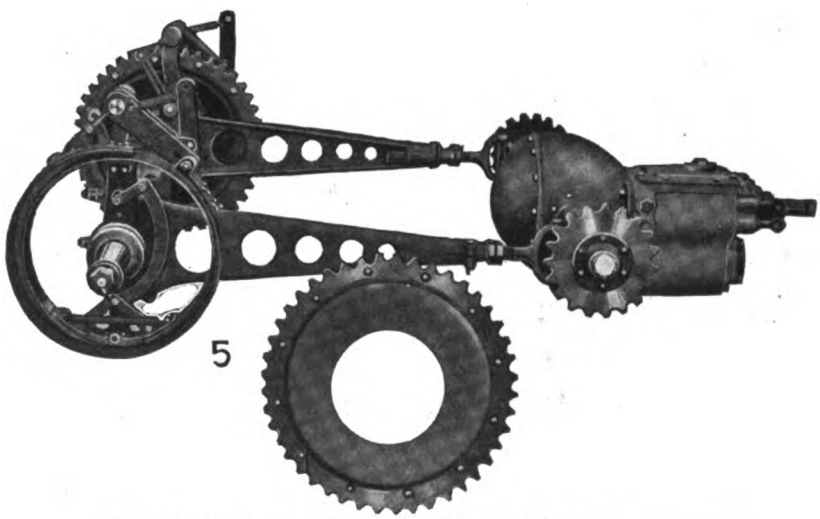
SHELDON

FRONT AXLE No. B-129

One Ton Equipment, D-13



Brakes D-132, Jack Shaft TD-130, Rear Axle B-139.



Same equipment showing brake drum and sprocket removed.
All shown on Bulletins. Mailed free on request.

SHELDON AXLE COMPANY

WILKES-BARRE, PA.

CHICAGO BRANCH: 68 East 12th St. **DETROIT BRANCH: 1215 Woodward Ave.**

Please mention the "Power Wagon" when writing to advertisers.

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Real Co-operation For Motor Truck Buyers

What is the most helpful co-operation between the manufacturers of a motor truck and the prospective buyer of such a truck?

Is it an elaborate "paper" analysis of his trucking or delivery problem, or is it real practical first-hand information, based on 12 years' experience, regarding the work which that particular make of truck is actually doing for others in the same kind of work, in exactly the same city?

In other words, doesn't actual Truck **performance** for 12 years in this case outweigh new theories on paper? **Age, Maximum Output and Prestige Are Combined in**

G. V. Electric Trucks

We have sold in one city no less than 1019 G. V. Electrics. Hundreds of them have been operated by the original purchasers for from 3 to 10 years. We know their strong points and limitations.

And, here's what should interest you—we would rather lose the order (and often do) than to sell our trucks where they would not be adapted for the work in question.

One of 62 G.V. Trucks now in service of Amer. Express Co.

With us co-operation means patience, fair dealing, a permanent selling policy and ample resources to back it up. Does this principle appeal to you? Consider us at your service.

Catalog 72 and other data on request.

GENERAL VEHICLE COMPANY

PRINCIPAL OFFICE AND FACTORY

LONG ISLAND CITY, N. Y.

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THE POWER WAGON

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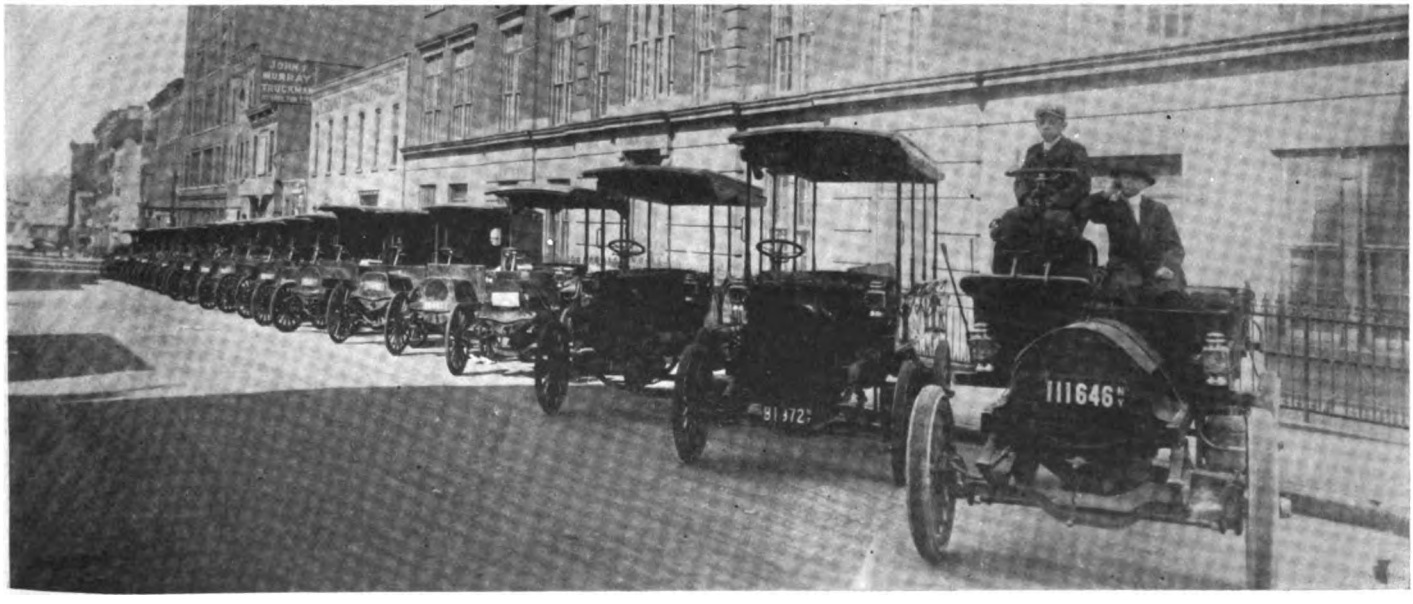
Professional Haulage.

Much of the Future Development of the Motor Wagon Will Be by Professionals.

THE DESIRE of motor wagon manufacturers to provide a wider and more substantial market for their product has resulted in the persuasion of business men and capitalists to seek a profitable and expanding field for their brains and dollars by the formation of motor wagon haulage and delivery companies. This movement, though as yet limited, is already well defined and gaining considerable headway.

Merchants and tradesmen in whose business the transportation of freight by road is a comparatively minor consideration, and who have hitherto been unable or too timid to tie up capital in an up-to-date motor wagon installation, or to put up with the possible inconvenience of a complete conversion from horse to motor equipment, have shown themselves eager to take advantage of the service of professional motor wagon operators, even to the extent of paying a premium for the superior service thus afforded. All of these are keenly alive to the fact that the almost total supersession of the horse by the motor wagon is now only a matter of time, and some of the buyers of motor haulage are using the service of the professional operator only until they feel confidence enough in themselves and with the new order of things to buy machines of their own.

Already there are no less than 30 professional motor wagon operators in this country, and with a few notable exceptions they have all been formed during the past few months. None of them, however, is as large as it might be, and the expansion in size as well as numbers of these companies in many cases is limited only by the amount of capital available for equipment, garage and



Fleet of 27 Chase motor wagons in the service of the Rockwell Transportation Co., New York City.

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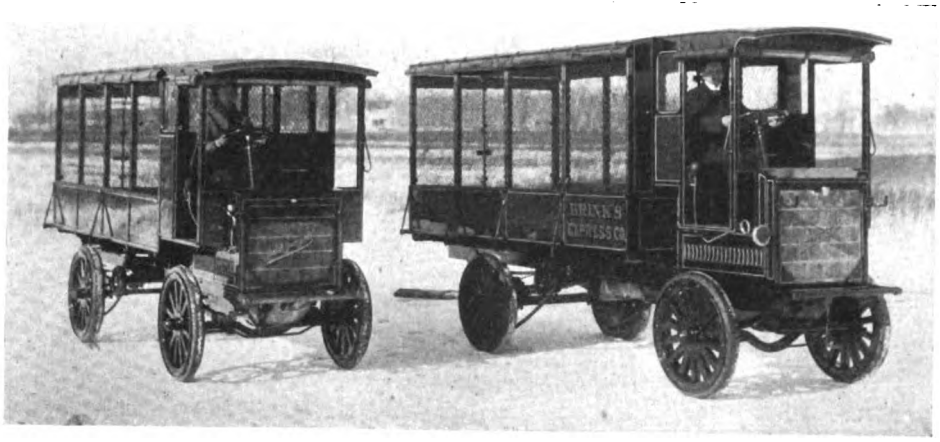

Two of five Lauth-Juergens motor wagons used by Brink's Express Co., Los Angeles, Calif., for professional local haulage.

pick-up station facilities, and operating expenses, etc.

* * *

Big Business Opportunity for Motor Professionals.

It is extremely significant, in this connection, that 40 per cent of the horse and wagon delivery business is now in the hands of professional operators. That is to say, only 60 per cent of all of the horses and wagons now in use are owned by the concerns that employ them. This means that 40 per cent of the road transportation business is ready to fall right into the hands of those wide-awake capitalists who are willing to finance motor wagon haulage and delivery companies in a manner big enough to absorb the tremendous volume of trade that is simply crying out for superior machine service.

* * *

Prospect Looks Bad for Horse Professionals.

To the professional haulage companies who so far have shown themselves unwilling to become converts to the motor wagon idea, there is more than a warning implied by this last statement. The action of the Adams Express Company, not only in superseding much of its horse service by some hundreds of motor wagons, but also in placing its new Detroit department on an all-motor basis from its very inception, should prove convincing enough. And if this were not sufficient, the well known policy of the American Express Company in motorizing its delivery department, the announced intention of Wells Fargo & Company to do the same thing, and the precedents afforded by the cases to be remarked later in this article, ought to point the way.

* * *

Cheaper to Motorize Than to Be Put Out of Business.

Consider the case of Chicago, for example. In this city there are two big professional haulage companies employing horses and wagons. Naturally these concerns would have to sink a lot of money at first in converting to motor equipment. *But it would be cheaper for them to do it now than to be literally put out of business later by the merciless competition of big motor wagon professionals.* And this is bound to happen, sooner or later, if the horse companies persist in doing business in the same old way. In all probability, however, they will awake to the true state of affairs only when it is too late to hold their business together.

Cheap Way to Gain Experience.

Suppose, now, one of these concerns wanted to find out for itself what a big fleet of motor wagons could accomplish in Chicago under the direction of a skilled transportation expert. It could easily be done if the company were willing and sincere enough. Let one of these companies, then, propose the organization of a motor wagon company for $500,000, and contribute $50,000 or $25,000, or even as little as $10,000, for this purpose. There are plenty of substantial men in Chicago who would be willing to contribute toward the balance of the required capital.

Such a company could buy right at the start a fleet of 100 three-ton motor wagons, and the backers of the concern could easily guarantee the business necessary to keep this equipment well employed, before the garage was built or a machine was delivered.

We have no hesitancy in saying that the performance of those 100 power wagons would prove such a surprise to the horse company that it would want to convert its whole equipment and consolidate with the new concern as soon as it was able to do so.

* * *

Easy to Get Business for New Company.

It is well to bear in mind that there are nearly 60,000 horse drawn wagons in Chicago, more than two-thirds of which are one-horse rigs. Of these, 24,000 are hired out by their owners for the service of others. Assuming, for the sake of argument, that one three-ton motor wagon could replace 12 horses, these 24,000 horse drawn vehicles could be completely superseded by 2,500 motor wagons. Therefore, at the rate we have assumed, the promoters of the new motor wagon company would have to secure but 4 per cent of Chicago's bought trans-

FRENCH'S,

LIMITED,

HAULAGE CONTRACTORS,

can hire you from one to five ton Petrol Vans on the most favourable terms for any period from one day to five years, or will maintain and run your fleet, guaranteeing maximum efficiency, at a fixed inclusive rate per mile.

314, High Road, Balham, S.W.

Phones: 965 Battersea. 5041 Brighton. 257 Maidstone.

An English advertisement, showing the degree to which professional motor service is practiced in London.

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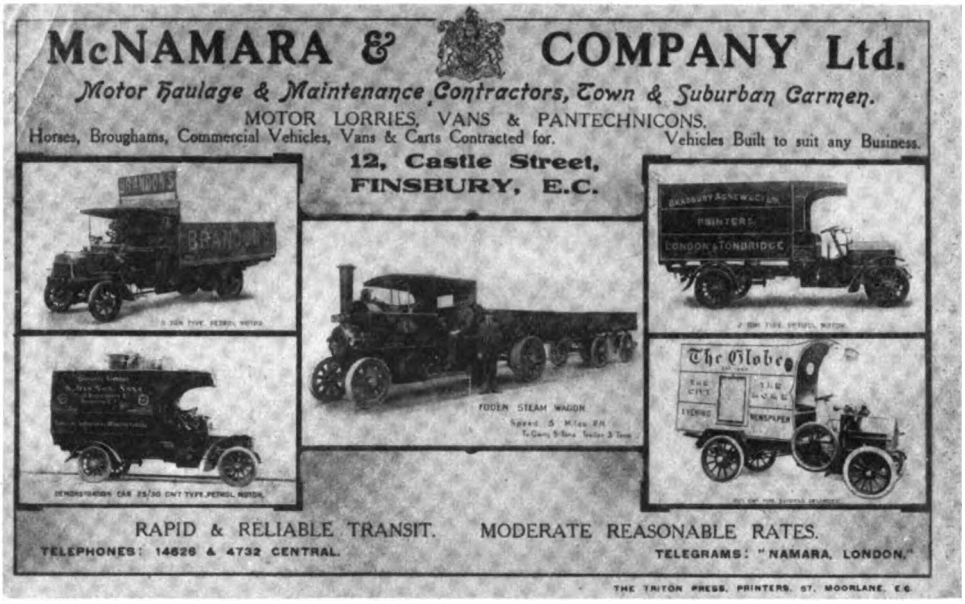
portation in order to keep the fleet of 100 three-ton machines fully employed. And this is only on the basis of competing with the hired horses, and does not take into account the extra business the motor wagon makes for itself by reason of its unlimited endurance, increased radius of action, and greater speed.

When the matter is presented in this way, it is not unreasonable to suppose that some day in the not far distant future there will be in Chicago professional motor service companies owning 3,000 power wagons. When this happens there will be very little street congestion compared with what obtains now, and the sight of a horse in the downtown area will be a novelty, even if it is allowed by law. *And in the meantime something will have happened to the professional horse operators.*

* * *

Big Fleets Establish Biggest Economies.

But this is anticipatory. At present we are concerned with the beginning of the professional motor idea. That the motor wagon is a paying proposition is proved by the wonderful statistics of this industrial infant prodigy. There are now upwards of 28,000 machines in service in this country, owned by about 9,500 individual operators. Practically all of these are showing a decided economy over the horse, in spite of many cases of flagrant abuse in overloading, overspeeding and maladministration. The most encouraging feature is the increasing number and size of large fleets of motor wagons, and the gratifying recurrence of single orders of tens, twenties and fifties, representing investments of up to $150,000 at a time for machines alone. It goes without saying that these massed installations are paying big returns on the investments, for if the single units and the small fleets are a paying proposition, how much more so are the big fleets, each of which requires but one expert administration, one garage, and one staff of mechanics, instead of a number of smaller and less efficient ones. Massing the motor wagon units, besides cutting down the "overhead" costs, also reduces the total number of machines necessary, by preventing overlapping services.


McNAMARA & COMPANY Ltd.
Motor Haulage & Maintenance Contractors, Town & Suburban Carmen.
MOTOR LORRIES, VANS & PANTECHNICONS.
Horses, Broughams, Commercial Vehicles, Vans & Carts Contracted for.
Vehicles Built to suit any Business.
12, Castle Street,
FINSBURY, E.C.
RAPID & RELIABLE TRANSIT.
MODERATE REASONABLE RATES.
TELEPHONES: 14626 & 4732 CENTRAL.
TELEGRAMS: "NAMARA, LONDON."
THE TRITON PRESS, PRINTERS, ST. MOORLANE, E.C.

Facsimile, slightly reduced, of the back of a postal card used by McNamara & Company in acknowledging the receipt of letters. The card comprises actual photographs on a silver background. Observe the types of motor wagons used by this great English concern.

* * *

Manufacturers May Sell Transportation.

It is quite possible that some of the biggest manufacturers will go into the transportation business themselves, and thus be able to make a bigger profit by selling transportation instead of machines, and so save themselves the embarrassment of undertaking to guarantee the maintenance of motor wagon equipment which, under present conditions, is often operated by non-professionals in a manner that neither does the machines justice nor obtains from their service anything like the amount of work they are capable of doing under expert administration. Confirmation of this opinion is afforded by the efforts of certain British makers, but the success of this radical departure has not been demonstrated by the results so far achieved. The general impression is that it is better for the makers to stick to their own business of manufacturing and selling their product, and to leave to others the use of it. Makers may be well advised, however, in particular cases, to assist transportation companies, but not to the extent of taking over the business.

Part of the fleet of 3½-ton Alco power wagons recently purchased by the Long Island Express Company.

* * *

Co-operation Leads to Professional Operation.

There is another angle to this pending change in motor wagon operation. There is the co-operative buyer to consider. It may not be generally known, but it is nevertheless an established fact, that co-operative horse delivery systems are in existence in many places in this country. Among those cities and towns which have such systems in operation are the following: Chicago, Ill.; Mishawaka,

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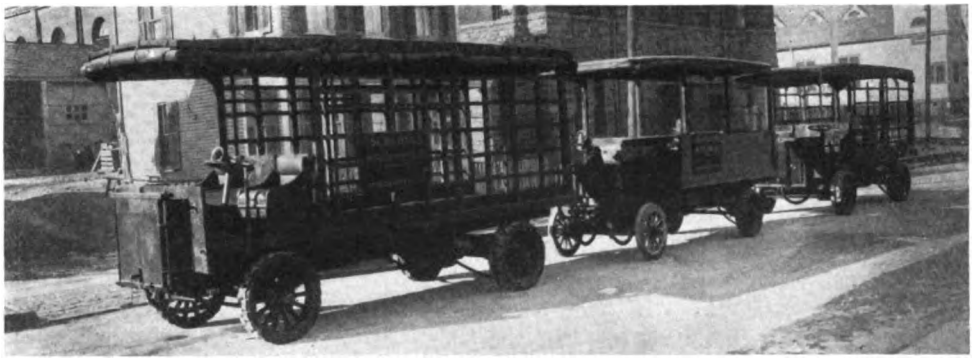

Some of the machines of the Suburban Auto Express Company, New York City.

Ind.; Algona and Creston, Iowa; Emporia and Newton, Kans.; Adrian, Ann Arbor, and Flint, Mich.; Alliance, Beatrice, Central City, Grand Island, Hastings, Holdrege, Madison, York and Wymore, Neb.; Bellevue, Canal Dover, Clyde, Fostoria, Fremont, Greenville, Marion, New Philadelphia, Oberlin and Tiffin, Ohio. Savings of anywhere from 20 to 70 per cent are reported. With the established economy of the motor wagon over the horse in all cases where it is properly applied and administered, this record of successful co-operation in horse practice furnishes a valuable precedent for professional haulage or co-operative delivery with up-to-date motor wagon equipment. Whether co-operating concerns will continue to buy individually or whether they will change over to the co-operative idea in buying as well as administration, as seems likely, does not greatly affect the question. The main thing is that co-operation is a logical and easy step to professional service of some form or another, and probably will be replaced by it eventually.

Another point of much importance is the fact that the known practice and administration of the first few big professional fleets of motor wagons will serve to standardize practice for the whole industry, a thing not possible under the happy-go-lucky systems now mostly in force.

* * *

Particulars of Some Motor Professionals.

Of the professional motor wagon operators who are already doing business in this country may be mentioned:

(1) The Motor Service Co., of Pittsburgh, which maintains a fleet of 10 motor vans. This company, which has contracted with 40 small stores to deliver packages, weighing under 25 pounds each, at a cost of 15 cents a parcel for city delivery and 20 cents in the suburbs, had some initial difficulties, but is said now to be progressing favorably.

(2) The Motor Service Corporation, of Chicago, which maintains a fleet of 15 fast, light delivery motor wagons. This concern does the parcel delivery for 23 of Chicago's medium-sized downtown stores, charging from 5 to 20 cents per package on a zone system, with 15 cents additional for C. O. D. orders. The company has adopted a unique system by which the contracting stores buy books of stamps in 5, 10, 20 and 25 cent denominations, the use of which reduces the bookkeeping system to a very simple matter, besides greatly facilitating the tracing of misdirected packages. Parcels must not exceed 5 pounds in weight, 1 cubic foot in measurement, or $20.00 in declared value, under the form of contract at present in vogue. This system is proving very satisfactory and profitable to all concerned.

(3) The Fischer Service Company, of Cincinnati, which employs a fleet of 25 machines, 20 of 4 tons capacity, and 5 of 6 tons capacity. These machines are hired out by the day on a 9 hours' basis, all time over this being charged for at 1½ times the regular price per hour. Contracts for tonnage were made with Cincinnati merchants before the machines were installed in service.

(4) Pratt's Express Company, of Minneapolis and St. Paul, Minn., which besides doing a regular express business, maintains a fleet of motor wagons for delivery

Three typical trade paper advertisements used at different times by the greatest professional motor haulage contractor in England.

of freight in any amount between the Twin Cities on a contract basis.

(5) The Mallory Transportation & Storage Co., of Toledo, Ohio, which will maintain a fleet of 28 motor wagons for professional haulage.

(6) The Bend Automobile Trucks Company, of Bend, Oregon, which maintains a regular power wagon service between Bend and Burns, 142 miles apart, and does professional haulage on a contract basis.

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(7) The H. C. & A. I. Piercy Company, of New York City, long famous as horse professionals and now well started in the motor wagon field with a fleet of 35 machines of all load ratings. This concern has a well organized corps of engineers and transportation experts whose business it is to prescribe the proper equipment for particular transportation requirements, with a view to leasing the service from the Piercy company under contract.

(8) The Pacific Motor Lines, Los Angeles, Cal., which will soon be incorporated for $200,000. It is expected that this syndicate will have over 100 power wagons in operation in southern California and Arizona before the close of the year. Contracts for enough freighting to keep 30 machines busy have already been made, and the motors will be at work in a short time. Motor wagons operated by the Pacific Motor Lines will make runs to mining camps and to towns off the railroads, under special contracts with the railroad companies. Western Arizona offers a great field for the activities of this concern, and a contract with one copper company calls for the hauling of 50 tons of ore a day through a distance of 8 miles to the railroad, where it will be loaded into cars by patented dumpers.

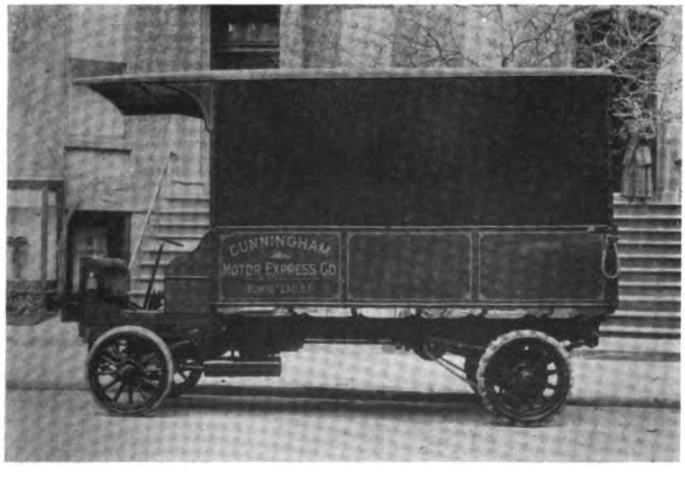
(9) The Motor Renting Company, of New York City, which leases machines to firms not desiring to own them. This concern now owns 42 power wagons.

Besides these there are many similar concerns, such as the Rockwell Motor Transportation Company, of New York City, with 27 gasoline motor wagons; the Manhattan Motor Wagon Company, of New York City, with 20 electric wagons; the Star Motor Delivery Company, recently incorporated in Chicago with a capital of $75,000; the Davenport Auto Truck Co., of Davenport, Ia.; the Auto Trucking Co., of New York City; the Allentown & Easton Express Co., of Allentown, Pa.; the Joplin Service Co., Joplin, Mo.; the Auto Delivery & Messenger Co., Omaha, Neb.; Merchants' Transfer Co., Wilmington, Del.; and the Dayton Auto Delivery & Service Co., of Dayton, Ohio.

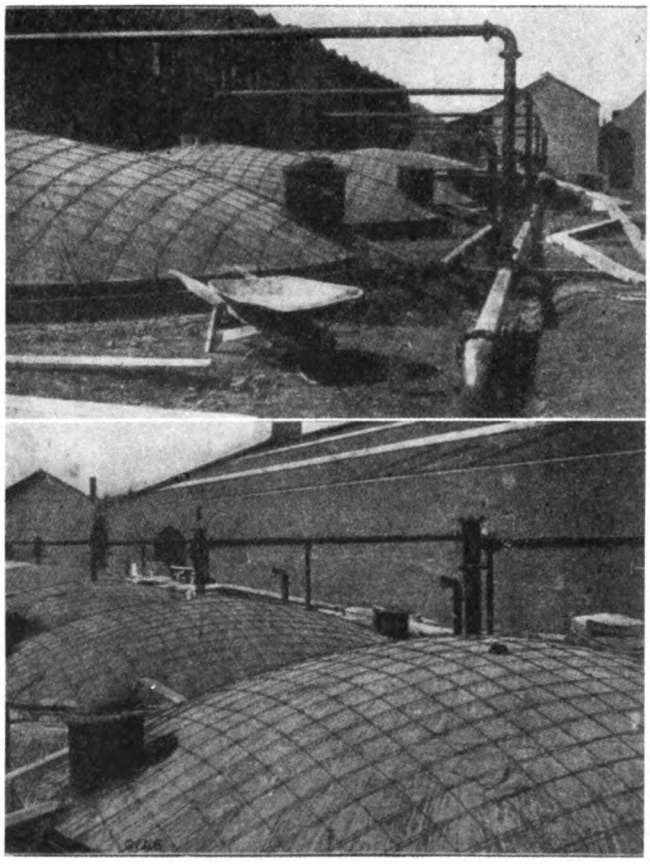
* * *

Professionals Numerous in Great Britain.

In Great Britain, too, many valuable lessons in professional motor wagon operation have been learnt and taught. John Bull has about 40 motor haulage contractors among which, we are credibly informed, the well-known concerns of McNamara & Co., Carter Paterson & Co., Eastern Motor Wagon Co., Pickfords, E. W. Rudd, and Thos. Tilling have enlarged their already big fleets of power wagons during the present year, and have on order numerous motor vehicles the delivery of which has been delayed on account of the great rush of business in the power wagon industry due to the railroad strike in England last August and the coal strike which ended a few weeks ago.



Machine used in professional haulage service in Hempstead, Long Island.



These views, from the "Commercial Motor," show a 177,500-gallon reservoir for gasoline, in London. Eleven 800-gal. tank wagons can be filled simultaneously. The connection is obvious.

McNamara & Co. have for hire a large number of 1, 2, 3 and 5-ton motor wagons, and 5-ton steam wagons with 3-ton trailers. This company also moves the mail in London under contract with the British postal authorities, and recently placed an order for an additional fleet of 50 motor wagons from a single manufacturer in order to cope with the mail contract in the most economical and expeditious manner.

French's Garage & Motor Works, another London concern, maintains a fleet of 26 motor wagons of from 1 to 5 tons load capacity. This company undertakes haulage contracts for any desired time, and frequently hires out machines for considerable periods to merchants who desire motor service without the expense of installation and the worry of administration. In such cases the vehicles are painted and equipped to the hirer's requirements, a practice long familiar in the professional horse wagon business. French's further undertake to

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maintain and run anybody's motor wagon fleet under a guarantee of maximum efficiency at a fixed inclusive rate per mile, and several substantial concerns have availed themselves of this service. The company also owns and operates passenger motor vehicles (including buses) in the south of England.

Carter Paterson & Co., one of the real old-time horse wagon professionals of London, are now thoroughly imbued with the modern motor wagon idea, and deliver packages by motor vans in 500 delivery districts comprised in an area of 420 square miles surrounding the City of London. Standardized rates are now in force, the charges being as follows: For parcels up to 7 pounds in weight, 12 cents; 14 pounds, 16 cents; 28 pounds, 20 cents; 56 pounds, 24 cents; 84 pounds, 30 cents; 112 pounds, 36 cents; and 6 cents for every additional 28 pounds. These rates are irrespective of distance, between any places that are worked by this service. Carter Paterson & Co. operate in a manner very similar to the American express companies, and so perhaps do not strictly belong to the class which comprises such concerns as McNamara & Co. and French's.

To the afore-mentioned concerns should be added the London General Omnibus Company, which operates about 1500 motor buses (shortly to be increased to 5000) and a fleet of over 50 motor wagons for hiring purposes; the firm of Liverpool Stables & Motors, Ltd., recently incorporated for $500,000; and some others. Some of the big London motor cab companies have wagon bodies which can be fitted to the cab chasses for use in cases of emergency. There are over 8,000 motor cabs in London, most of which are owned by less than one dozen big companies.

We have digressed considerably to show there is nothing very radical in the prophecy that there is big business awaiting the professional motor wagon operator. There is ample precedent for the establishment of motor service companies, and our examples will give business men a lead as to the modus operandi in particular cases they may have under consideration.

Now for a few words on the dangers and pitfalls that may be encountered in the working out of the motor wagon idea on the scale discussed in the foregoing.

* * *

Some Warnings and Suggestions.

There are four points to be borne in mind: (1) The necessity of ample capital, which should be sufficiently large to cover not only the big initial expenses of installation but also the cost of running a big business on a big scale. (2) The advisability of co-operation with the motor wagon manufacturers even to the extent of permitting the makers to have an actual or a supervisory control over the administration, upkeep and operation of their machines. (3) The question of price for the service. (4) The danger of attempting to disturb existing connections and contracts before establishing an absolute confidence in new and potential customers.

* * *

Motor Wagon Upsets Old Customs and Adages.

Taking the last first, it is claimed that this has proved a considerable hindrance to the fruition of some big schemes in England. But while there is some truth in the contention that traffic changes move so slowly as almost to defy detection by the onlooker; and that old customs die hard, we make no apology for the assertion that the motor wagon has already revolutionized many of the old practices and adages that date back almost to the dawn of civilization. Anyone who has not been in London for four or five years and who makes a visit there at this time will be more than mildly surprised at the traffic changes, and the absolute annihilation—let alone deadness—of some of the old customs, especially in the transportation business. And then again, things usually move faster in America than they do in England, and we have at least two good precedents for believing that the adages we have quoted do not quite fit in this connection—for the Motor Service Corporation of Chicago and the Fischer Service Company of Cincinnati had contracts for all the business they could take care of before a penny was actually invested in motor equipment, and after only a few months of experience the Chicago concern has been forced by pressure of business to order more machines and to increase its present facilities. Of course anyone will agree that it would be foolish to sink money in a big power wagon installation without receiving ample assurance of business before making an investment.

* * *

The Necessity for Ample Capital.

The necessity for ample capital will be apparent to all, and this, by the way, applies even more forcibly in the case of manufacturers. As President Thomas Neal, of the General Motors Company, very sagely points out: "Business men cannot afford to invest in motor delivery equipments where there is lacking that assurance of permanence which implies the manufacturer's ability to give the service that the purchaser must have to insure successful operation year after year."

* * *

Co-operation with Makers is Essential.

This brings us immediately to the next point—that the co-operation of the manufacturer with the professional motor haulage contractor, either in an advisory or a supervisory capacity, is an important, possibly even an essential, factor for the success of professional motor haulage on a big scale. It is not improbable that there will be formed in the near future at least one haulage company in which a certain wagon maker will control 51 per cent of the stock so that he can look after his machines to the best advantage, with the assurance that no one will be allowed to override him on a matter of policy. Failing some such an arrangement, which has obvious objections in certain cases, the big manufacturers could sell machines under a maintenance guarantee that would give them the absolute right of supervision over or interference in the operation of the motor equipment, even to the extent of nominating the garage superintendent and his helpers, and perhaps even the drivers. This would at least prevent the power wagons from being abused, and would have the effect, in most

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cases, of causing the machines to be worked approximately close to their maximum economical capacity. Concerning this ideal method of working, it is interesting to note that all of the big motor wagon manufacturers are freely spending money, time and effort in the building up of elaborate transportation cost bureaus, and these departments would be well fitted to handle just the kind of business we have in mind.

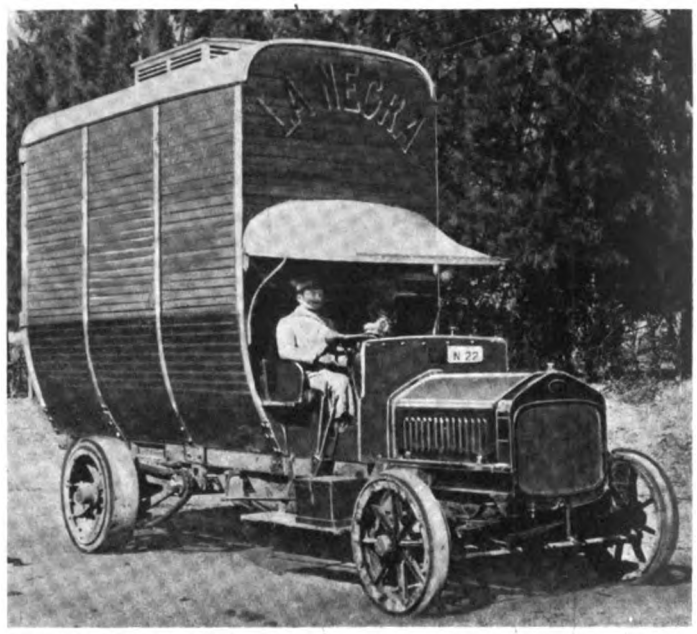
* * *

Motor Wagon Service Is Worth a Good Price.

The question of price for motor wagon service is the last remaining point to be considered, and certainly not the least important. Many people have the delusion that because the motor wagon is more economical than the horse, the service of the machines, on a mile, load, ton mile, time or complete service basis, as the case may be, should be sold at a less figure than is charged for horse service of the same amount. Nothing could be farther from the truth. From a purely business aspect, the machine service is worth more than horse service. It is quicker and more reliable under extreme weather conditions. It has an advertising value that is worth money. It brings new trade from old territory and permits expansion into new districts that are absolutely inaccessible to the horse. Are not these worth something? Then why should anyone try to sell this vastly superior article of commerce at a less price than the obsolescent and inferior one it has displaced?

These are practically all the essential points for consideration. The rest is a matter of detail in particular cases. That the motor wagon pays, no well informed person can deny. Its economy has been proved in innumerable cases. The increasing size and number of big fleets would establish this without question to the business man. If particular cases are needed, we can cite that of a certain haulage contractor who formerly moved 70,000 tons of raw product a year by horses at a cost of 30 cents a ton, and who now does the same work by motor wagons for a fraction under 16 cents a ton, showing a saving of $9,800 on a former vehicle cost of $21,000 a year. If the reliability of the motor wagon is in question, one can cite the case of the London General Omnibus Company, whose standard motor bus is equivalent to a 4-ton power wagon. In covering 94,000 miles by 130 machines on a particular service, only 9 involuntary stops were made. Economy and service like this cannot be even approached by horse-drawn vehicles, which are doomed to be replaced by motor wagons, in a great many cases, at least as fast as the old equipment wears out—and this goes for the horses as well as the wagons and harness.

We were past the experimental stage of motor wagon use and application at least six years ago. We are nearly through the educational and general publicity stage. And we are now starting on the big expansion period, when big things will be done by big men in a big way. But it won't be long before what we now consider big things in the motor wagon industry will seem quite as insignificant, in comparison with what will be done in the future, as Stephenson's little trains on the diminutive Stockton & Darlington Railway, compared with the magnificent rolling stock which crosses the continent on schedule time in three or four days. Our Chicago example is not merely a case of what might be done in the big cities of this country. It is a forecast of what soon will actually come to pass, and when we get to that period of development the prospects for still further expansion will seem just as roseate to the motor wagon factor as does this seemingly ideal possibility at the present time.



A 3-ton refrigerator meat van supplied by the Albion Motor Car Co., Scotstoun, Glasgow, Scotland, to a progressive South American butcher.

Interior of the van, from the rear.

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New York Parade.

The Most Spectacular Event of Its Kind Ever Held in the World.

The task of assembling 500 machines at Bowling Green was no easy matter. Ask Ed. Curtis.

THE SECOND annual power wagon parade of the Motor Truck Club of New York was successfully held on Saturday, April 13 last, in the great eastern city, and proved to be the most spectacular turnout of motor wagons that has ever taken place. By actual count there were 507 machines in the parade, of which 344 were officially entered. The gross value of all of these motor wagons was $1,420,000, averaging $2,800 per machine. Of the official entries, 296 were gasoline machines, 44 straight electric, and 4 gasoline-electric. The average tonnage was 2.4, and about fifty per cent of all the machines were of 3 tons capacity or over. About 60 per cent belong to private users, the rest of them being owned by manufacturers and dealers.

The parade formed at the Battery at 1 o'clock and started off shortly after 1:30 p. m. directly up Broadway to 125th street, making a slight detour through 22nd street, Fourth avenue, 27th street, Fifth avenue, and 48th street, thence again up Broadway. The reviewing stand was at 100th street. The route was 8 miles long, but no attempt at speed was made on account of the difficulty of keeping up the formation through the city traffic. About 2½ hours were required to cover the route, and the long line of machines took about 50 minutes to pass a given point.

The band on this Fifth avenue motor bus prepared the way for the bigger sensation following.

E. W. Curtis, Jr., of the General Vehicle Co., acted as chief marshal, with C. W. Fletcher and T. A. Aspell as his chiefs of division. They were ably assisted by a corps of aids numbering 25 and scattered through the line, each in charge of his division. At the head of the line were mounted police, then a big Fifth avenue bus carrying the band. Next rode the officers of the Motor Truck Club, and the press cars followed.

The trucks were arranged alphabetically, according to the alphabetical list of the entrants, and broken into three general divisions. Ample police regulation had been secured to keep the line well closed and to avoid traffic complications at street crossings. The line covered a stretch of something more than three miles—the most powerful traffic display and the most valuable ever shown in New York or any other city.

The battery truck cranes received their full share of attention from many interested spectators.

The Motor Truck Club charged an entrance fee of $2 per truck entered, in return for which fee each motor wagon was given a pair of the official club flags and a pair of panel banners bearing the name of the truck's make. Machines entered by dealers were restricted in their advertising signs to these two forms, but private entries were allowed to display as much decoration and advertising matter as they chose.

It was not the purpose of the club to make any revenue from entries other than just enough to cover the actual expense. The chief aim of the parade was to make an effective showing of motor wagon representation in this center, as an encouragement to the extension of the use of machines and as a moving display of the widely varying uses to which power wagons can be put. From the standpoint of the entrant, it was pointed out that thousands of people would watch this parade, and firms entering their trucks would enjoy the benefit of showing the public that they employ the latest ideas in

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transportation and delivery service. As a demonstration it was regarded as beneficial alike to the owner and the manufacturer.

Every owner of a motor truck in New York was invited to participate, and in order that it should not interfere seriously with business, the time was set for Saturday afternoon. The route covered some of the most populous thoroughfares of the city. Several large trucks were used as band wagons, and there was plenty of music scattered through the line. The load limit for trucks entered was governed only by the police regulations, and the committees aimed to encourage merchants, manufacturers and others to make as interesting a business display in their vehicles as possible.

Charles E. Stone, secretary of the Motor Truck Club, 427 West 42nd street, did much of the hard preliminary work that made the affair the big success it turned out to be.

A full list of the participants would be too long to print here, but it was interesting to note that 72 machines were shaft drive, 8 worm drive, and the rest—the big majority—chain drive. Of the gasoline machines, 35 per cent had the motor under a hood or bonnet, the rest under the seat or floor boards. Only 27 machines had left hand control.

Of the individual makes represented, the General Vehicle Company took the palm with 41 electric machines, mostly of high load capacity. The General Motors Company made a fine showing with 20 gasoline models, averaging 1½ tons capacity. The Autocar Company had 46 gasoline 3,000-pound models in line.

Ruppert's splendid installation of G. V. electrics made a profound impression.

A SIGNIFICANT DEVELOPMENT.

Within the past few weeks an organization of motor truck experts has blossomed into existence in Chicago. The Commercial Motor Vehicle Company opened up a new service building last month at 2637 to 2641 Cottage Grove avenue. The building is now being remodeled to accommodate this live organization, and there is being installed some $25,000 worth of machinery, together with repair parts to the value of $30,000.

The guiding head of a large corps of specially trained traffic experts, mechanical engineers, salesmen, mechanics, drivers, is Fred Robyn, whose wide experience both in the direction of automobile construction and selling organizations of some of the largest companies in the business spells success for the new enterprise.

Impressive scene of the motor wagon parade just about to start from Battery Park.

Mr. Robyn has outlined the plan for the conduct of the business of the Commercial Motor Vehicle Company, which is most comprehensive. "We have a traffic department composed of men who have had actual experience in handling haulage problems, which will, upon request, investigate present delivery service and offer recommendations for changes and adaptations that will argue for greater economy, the utmost efficiency and will cover the subject scientifically, after the manner of railroad traffic experts.

"A board of mechanical engineers has been created to work in conjunction with the traffic department, applying scientific principles and features as an aid to the buyer in the selection of the particular truck and model best fitted to accomplish the delivery work to be done. Several makes of trucks will be handled by the new corporation, which insures an unbiased expert opinion as to the car the user should purchase.

"Our company will give a bond in every case where one of our trucks is adopted that the service on which the sale is made will be guaranteed."

View of the parade on Broadway near 28th street. The whole line took 50 minutes to pass.

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The Underwood Bill.

Leading Manufacturers Present Brief to U. S. Senate Protesting This Measure.

BELIEVING that the passage of the Underwood Bill, which provides for a reduction in the present United States tariff on imported motor vehicles, would have a harmful effect on the automobile industry, a number of the most prominent manufacturers have, through a committee of three, compiled and submitted to the Finance Committee of the United States Senate a powerfully written brief protesting against this measure.

The members of this committee are: Charles Clifton, treasurer of the Pierce-Arrow Motor Car Company, Buffalo, N. Y.; W. C. Leland, vice-president and general manager of the Cadillac Motor Car Co., Detroit, Mich.; and Henry B. Joy (chairman), president of the Packard Motor Car Co., Detroit, Mich.

* * *

Representative Makers Named in the Brief.

The manufacturers named in the brief comprise: Pierce-Arrow Motor Car Co., Locomobile Co. of America, Peerless Motor Car Co., Packard Motor Car Co., Cadillac Motor Car Co., Premier Motor Mfg. Co., U. S. Motor Co., Nordyke & Marmon Co., Pope Mfg. Co., Hudson Motor Car Co., Metzger Motor Car Co., The Waverley Co., and Willys-Overland Co.

These companies have a gross capitalization of $68,007,651, employ on the average an aggregate of 35,095 men, pay out yearly in wages an average of $26,973,797, and buy materials to the value of $69,068,747 every year.

* * *

Present Tariff Keeps Countless Millions at Home.

The brief sets out in convincing form that the present tariff on motor vehicles has prevented the going abroad of countless millions of dollars worth of business, and that a "hair-splitting measure of protection only partially protects and stimulates imports and the commerce and industries of foreign countries to a greater or less degree."

* * *

Grave Dangers to the Motor Wagon Industry.

Grave warning is given as to the peril the motor wagon business would encounter from foreign competition if the tariffs were reduced. Foreign motor wagon practice is well set and hardened, whereas in this country we are still in a more or less formative stage, and foreign competition at this critical period would tend to set back the home industry. The conclusion is that "a proper and wise tariff is the only safeguard."

* * *

Foreigners Use American Machinery.

The wages paid abroad to automobile shop workers are from one-third to one-half those prevalent in American factories. The theory that an American workman can produce a correspondingly greater output is completely exploded, for it is shown conclusively that the most famous foreign factories employ hundreds of thousands of dollars worth of American machine tools.

Cost of Labor Is Most Important Item.

Except in one or two notable cases, the cost of labor forms an appreciable percentage of the total cost of production of a motor vehicle, amounting in some of the best machines to exactly 50 per cent of the total cost. It is further shown that a reduction of 5 per cent in the import duty on a motor vehicle, as proposed by the Underwood Bill, would have to be met, in the case of a machine like the Packard, by a horizontal reduction in wages of 8 per cent. This would mean a total of $400,000 in the case of the Packard company, which is equal to 4 per cent on the capital stock.

Another point conclusively proved in the brief is that the maintenance of the present tariff forces foreign manufacturers to establish branch factories in this country if they desire to compete for the American market.

* * *

All Should Use Influence to Kill the Bill.

There are many other matters considered, but enough is shown here to establish the fact that the Underwood Bill, if passed, would be mischievous in its effects on the automobile industry, and the "Power Wagon" urges its readers to bring all possible pressure to bear upon legislators to prevent the reduction of the present tariffs.

S. A. E. SUMMER MEETING.

The dates for the summer meeting of the Society of Automobile Engineers have been fixed for Thursday, Friday and Saturday, June 27, 28 and 29. The headquarters will be in the Hotel Pontchartrain, where the meeting will be held in the convention hall. The program of entertainment and sightseeing in Detroit is now in the hands of local committees composed as follows:

Entertainment: H. E. Coffin (chairman), Hudson Motor Car Co.; H. W. Alden, Timken-Detroit Axle Co.; Russell Huff, Packard Motor Car Co. Finance: H. M. Leland (chairman), Cadillac Motor Car Company; Tracy Lyon, General Motors Company. Transportation: F. H. Floyd (chairman), E. E. Sweet, Cadillac Motor Car Company; H. R. Corse, Lumen Bearing Company. Hotels: G. W. Dunham (chairman), Chalmers Motor Company; F. H. Berger, Oakland Motor Car Company; J. G. Vincent, Hudson Motor Car Company.

A very large attendance of members is expected and the intention is to emphasize the social features of the gathering.

NEW HEADQUARTERS FOR S. A. E.

About May 1 the New York headquarters of the Society of Automobile Engineers will be removed to the new 20-story building of the United States Rubber Company at Broadway and Fifty-eighth street, in the heart of the Metropolitan automobile district.

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Economic Road Speeds.

Remarkable Symposium Shows That This Problem Is far from Being Settled.

THE RESPONSE of our readers to the article on "Motor Wagon Speeds," which appeared in the April issue of the "Power Wagon," shows beyond a doubt that the last word has by no means been said on this intricate and vexatious problem. Out of some hundreds of "Letters to the Editor" on the speed question, received during the month, only 16 of them show compliance with the N. A. A. M. speed table, and some of these even are qualified. Those of our correspondents who accept the N. A. A. M. speeds include: The Adams Bros. Co., The O. Armleder Co., Avery Co., Dart Manufacturing Co., Federal Motor Truck Co., General Motors Co., General Vehicle Co., Kearns Motor Car Co., Lozier Motor Co., W. H. McIntyre Co., The Mora Power Wagon Co., Pittsburgh Machine Tool Co., Royal Motor Car Co., Sandusky Auto Parts & Motor Truck Co., Speedwell Motor Car Co., Transit Motor Car Co.

* * *

Why Speed Standardization Is Difficult.

Before presenting the most interesting symposium on motor wagon speeds that has ever been compiled, it will be pointed out why the problem is so involved and difficult.

* * *

In order that standard speeds may be scientifically adopted, the following points should be taken into consideration:

(1) The diameter of motor wagon road wheels.
(2) The load distribution: (a) machine light; (b) machine loaded to capacity.
(3) The main and auxiliary spring suspensions.
(4) The tire equipment.
(5) The road conditions.
(6) The kind of load carried.
(7) The climatic conditions.
(8) The driver of the machine.
(9) The speed of the engine or motor.
(10) The gear reduction necessary to drive at any definite speed.
(11) The traffic conditions—including starting and stopping.
(12) The cost and administration problems of the concern using the machine.
(13) The repair and maintenance guarantees agreed to by the maker or dealer.
(14) The repair facilities.
(15) The facilities for providing spares to take the place of machines laid up for overhaul or repair.

* * *

Perhaps there may possibly be some other important points to be considered, but these are enough to show the complexity and perplexity of the problem. There are some who consider that the whole speed question resolves itself into a "highbrow" discussion on the fact that the force of an impact is proportional to the product of the mass into the square of the velocity at which it is moved. These theorists then go on to show that by increasing the mass one can increase the "ton-miles" in simple proportion while increasing the impact in the same ratio; but if the speed is increased, the "ton-miles" are increased only in simple proportion, whereas the impact increases as the square of the speed. Ergo—and usually with a cynical, know-it-all smile—increased speeds are destructive and not economical. But a glance down our list of other factors which must be considered, will show this reasoning to be true only so far as it goes—and it is only a very small part of the problem.

* * *

Standard Speed Implies Standard Machines.

If all machines of any given load rating were completely standardized—and this appears to be impossible even under the most idealistic conditions—the question of speed standardization would be rendered much easier; in fact, in cases of approximately equal business, road and traffic conditions, it could be made absolute. But we are as yet very far from the time when all makers of motor wagons will agree on the same engine powers and speeds, spring suspensions, gear reductions, wheel diameters, load distributions, platform heights, tire equipments, and other essential points. The best we can hope for is a judicious compromise in which these design features will average up about equally in their relation to economic road speeds. And even then there will be the other disturbing factors which have already been pointed out. Here is where the Motor Wagon Users' Association would fit in to determine operating conditions in different businesses and localities, for surely the users know more about their own business needs than do the manufacturers. And if they don't it is about time they began to find out.

* * *

The following are selected out of over 400 letters on the question of economic road speeds received by the editor of this journal during the past month:

* * *

Increased Speeds Entirely Practical.

Superintendent Clark of the Motor Vehicle Department of the Adams Express Company, New York City, considers that the N. A. A. M. speeds are too low. As Mr. Clark has under his direct supervision one of the greatest motor wagon fleets in the world, comprising considerably over 100 machines, about equally distributed between gas and electric types, varying from 1 to 4½ tons in load capacity, and including six different makes, his opinion is of the highest importance. His letter is as follows:

"In the writer's opinion, practical speed limits are affected by the nature of the load (some loads having greater inertia than others), road conditions, etc., but I think that an increase of 10 to 20 per cent in the speeds listed in the N. A. A. M. table for the several capacities would be entirely practical, and would not increase the cost of maintenance sufficiently to offset the increase in performance. I state this on the assumption that maximum speeds are being discussed,

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and not average speeds. I suggest that, if the speed of power wagons is reduced to limits which the tire companies would like to impose, the superiority of motor trucks over horse-drawn vehicles would not be at all commensurate with the greater cost."

* * *

Economic Speed a Question for the Auditing Department.

John Younger, mechanical engineer of the Truck Engineering Department of the Pierce-Arrow Motor Car Co., Buffalo, N. Y., contributes a valuable letter which confirms one of our own expressions of opinion, viz.: " . . . The problem settles down to a question of individual bookkeeping and the exigencies of a particular situation" (from our April, 1912, issue, page 18). He also points out that the speed question in England has not been solved so completely as we had supposed. Says Mr. Younger:

"Your very able editorial on the question of motor wagon speeds has been read by us with great interest. The whole question is one really which, in a sense, should apply to the Auditing Department; that is to say, what is the most economical speed at which we can just wear out the truck by fast running, allowing for the depreciation and upkeep, and providing a sinking fund to renew the truck at the end of its life. This is a question which can be answered in a large number of ways. It may perhaps seem clearer if we take the anology of a machine shop. The old-fashioned machinist used to run his machines at slow speed and watch them very carefully. He got exceedingly long life out of them but unfortunately his machines were becoming obsolescent while they had not by any means worn out. The modern machine shop foreman runs his machines at top speed, taking the last ounce out of them. He knows that while they will wear more rapidly, yet their life will be much more valuable, inasmuch as they are working up to highest efficiency all the time and paying well for the space they occupy.

"The whole thing is really a matter of opinion. Some owners would prefer to run their trucks fast and get their total tonnage carried as quickly as possible. Others are governed by local conditions and cannot run their trucks at more than a certain speed. This latter case applies particularly to city work in which it is really the average speed of traffic which determines what the speed of the truck shall be. For instance, you can drive down Wabash avenue (Chicago) just as fast in a small Brush runabout as you can in a 66-hp. Pierce-Arrow, provided there is, of course, a sufficiency of traffic about to bring down the speeds of both cars.

"You mention that British practice has decreed certain speeds of trucks, incidentally that a 2-ton truck should run about 12 miles per hour. This is the law of the land, but I can assure you that it is not at all acted up to. For instance, one well known maker of passenger vehicles habitually runs these with a load of 34 passengers at a speed of up to 20 miles per hour. Fire engines having a gross weight of about 5½ to 6 tons have actually traveled up to 45 miles per hour. The speed limits in the case of heavy vehicles, except in the very heavy ones, are not at all adhered to. It is also the law of England that pleasure car vehicles should not travel more than 20 miles per hour, but speeds up to 35 miles per hour and even more are really the average.

"The question is also one of design and spring suspension. A vehicle which is well 'sprung' and well designed can run at a much higher speed than one which is put together anyhow.

"To take a further analogy in railway practice, heavy locomotives run at just as high speed as do light locomotives. In fact, very often, the heavier locomotive runs much faster.

"In my opinion, it would be very unwise to formulate any laws of speed. At present the industry is young and it must develop along its own lines. There was an attempt made in the early days to secure a low rate of speed for railways, but fortunately this was not carried into effect. Otherwise we should possibly be traveling just now at the absurd rate of 15 miles per hour."

* * *

N. A. A. M. Table Right, With Qualifications.

Curiously enough, F. J. Curtis, vice president of the Pittsburgh Machine Tool Co., Braddock, Pa., presents the same machine shop parallel as is quoted by Mr. Younger. His letter follows:

"We are of the opinion that the N. A. A. M. table is as near correct as such a table could be made. It is a question, however, as to which way the owner would look at the matter.

"In machine shop practice it is sometimes found to be more profitable to crowd the machine up to and perhaps beyond its limit, and when the machine is worn out, throw it out and put in a new one. In other words, under this system it is the object to get the greatest amount of work out of a machine without repairs, and when it needs repairing, throw it in the scrap.

"The situation might arise in the motor truck service where it might be advisable to get the greatest amount of tons out of the wagon in the shortest space of time, and we have no doubt that some users will take this view of the matter. That is, it might be found cheaper to crowd two or three years' work into the truck in one year and then sell the truck for junk and replace it with a new one.

"To get the longest life out of a truck with the greatest amount of tonnage is quite a problem, and of course the locality in which the truck is used will govern this to a greater or less extent.

"It should be possible in a city like Chicago with level streets that are fairly smooth to run a truck nearly twice as fast as in a city like Pittsburgh where the streets are rough and very hilly, and at the same time not damage the truck any more than running at a slow rate in Pittsburgh."

* * *

Speed Should be Governed by Service Conditions.

R. A. Radle, of the National Motor Truck Co., Bay City, Mich., contributes a thoughtful letter which is valuable as comprising the experience of the user with that of the best type of manufacturer. It is extremely significant that Mr. Radle confirms in one important particular the opinion of Superintendent Clark of the Motor Vehicle Department of the Adams Express Company. Incidentally, a very important point appears in the last paragraph. His letter speaks for itself:

"We have read with interest your article 'Motor Wagon Speeds' which appeared in the April issue of the 'Power Wagon.'

"This is a matter which has interested the writer for a great many years, having experienced the detrimental results of over-speeding covering motor trucks up to three tons capacity. There is no question in our minds as to the speed of a motor truck being governed to a very great extent by the service conditions in which it is operating, and we do not think any fixed rate of speed will apply generally.

"There is no question whatever as to the advisability of operating motor trucks at the lowest possible rate of speed consistent with the conditions of service. However, we have experienced numerous cases where wagons have paid for themselves in one to one and one-half years' service and proved a paying investment, and had they operated at a rate mile per hour according to the N. A. A. M. schedule. motor truck installation would have been out of the question.

"The rate of speed must also be governed by construction. Spring suspension is a very important factor in deter-

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mining the rate of speed which car should travel. On our 1-ton truck, we are building same for normal speed, loaded, of 15 miles per hour, and light, 18 to 20.

"In making installations, we shall be governed entirely by local conditions and car service."

* * *

Electrics Make Up Time in Starting.

W. J. St. Ouge, of the Anderson Electric Car Co., Detroit, Mich., makes an interesting comparison between the speeds of gasoline and electric motor wagons, raising the point that the gas machine should travel faster than the electric in order to make the same average speed as the other under traffic conditions which occasion frequent starting and stopping. There are all the elements of a nice little controversy in this letter, which follows:

"At the present time, we are engaged in the manufacture of three types of electrically propelled trucks of 1,000, 2,000 and 3,000 pounds capacity. Our catalog rating on these three types is 14, 12 and 11 miles per hour, respectively.

"We note in your article that you draw the same conclusion which we did from a casual observation of the speed table approved by the N. A. A. M., namely, that their mile per hour rating corresponds quite closely to that now considered economical and practical in electric vehicle construction. 'Detroit Electric' vehicles are all equipped with solid tires, as you probably observed from an examination of our catalog.

"We have from time to time had occasion to make test runs on delivery routes, etc., covering the same ground under the same conditions and with the same load that a gasoline truck of higher mileage per hour capacity had covered previously on the same day or the day before. It was the impression of the 'would be' purchaser of the electric truck in each case that such a test would prove detrimental to the claims made by us for the electric truck on account of the slower speed at which it was built to operate. Final tests carefully tabulated showed, however, that while the electric did not travel as fast as the gas truck, it did travel more of the time for the simple reason that there was no delay in starting after making a stop. The result was on a run of anywhere from 35 to 50 miles or so, the time of the electric over the route would not show up to be much slower than 8 or 10 minutes, which was, of course, a small matter, everything else considered. This would seem to be an argument in favor of raising the speed table in order to have the gas truck prove up to what it is supposed to be. If this is done, however, it is evident that the construction of the gas truck will have to be changed to correspond with the increased speed requirement, and there will also be introduced a heavier maintenance and depreciation expense.

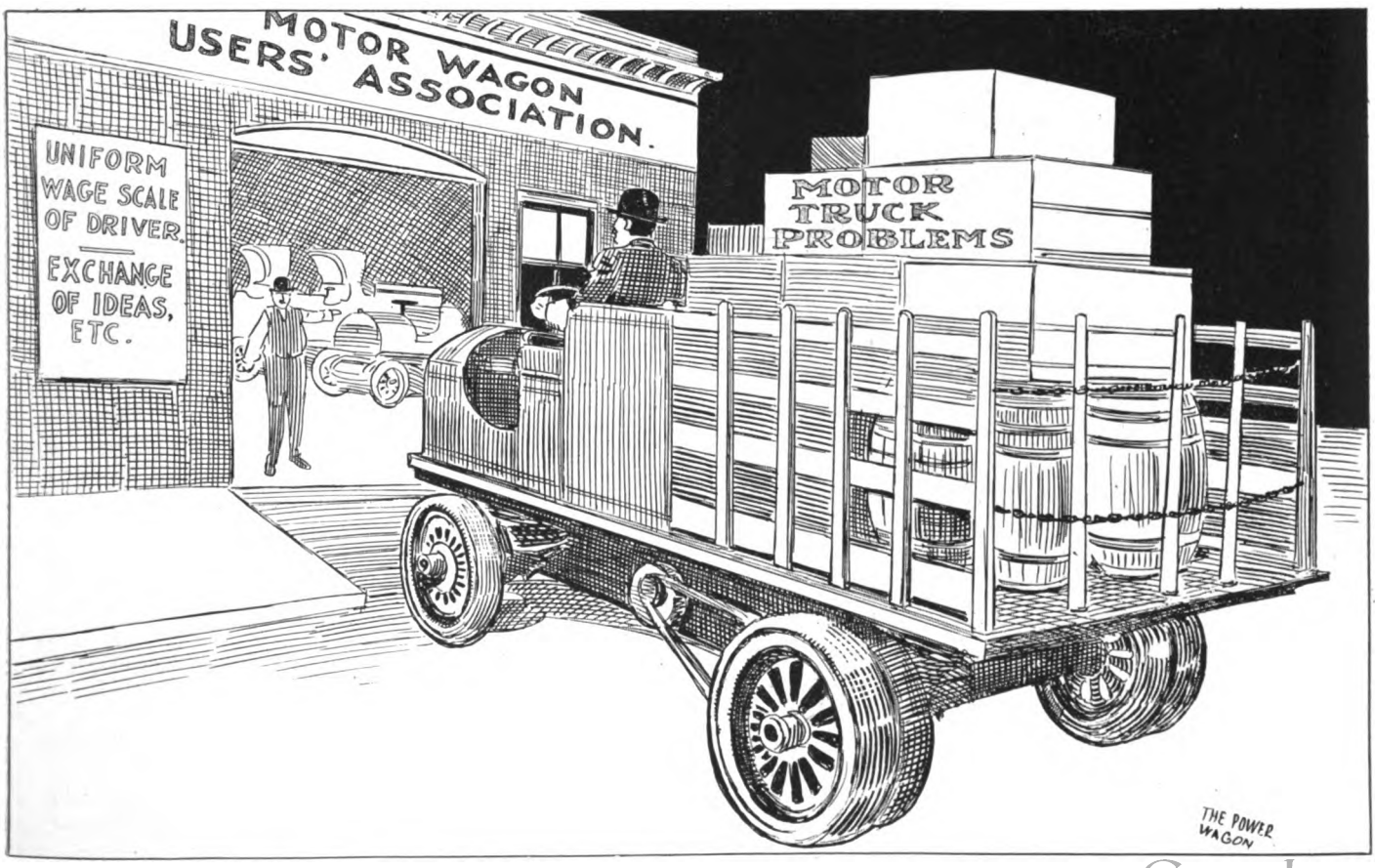
"This all leads us to believe that the speed table as adopted by the N. A. A. M. executive committee is not in the least too high for economical road speeds under the much abused term known as 'normal road conditions.' We are inclined to believe that when full allowance is made for the usual road traveled over (which is not by any means the kind of road thought of when the word 'normal' is used, but which is nevertheless the kind traveled over when a truck is used), the speeds arrived at on all the three types of cars which we build will be about equivalent to those which we have adopted as practical."

* * *

Speeds Should be Low to Prevent Abuse.

Louis Ruthenburg, chief engineer of the Kentucky Wagon Mfg. Co., Louisville, Ky. (electric wagon makers), proposes two alternatives and suggests what might be termed "the easiest way" to be the best way out, all things considered. His letter follows:

"In the opinion of the writer there are but two alternatives open to the truck manufacturer in the matter of establishing speed ratings: First, a complete survey of conditions under which each machine sold is to be operated, these being met by a truck capable of effecting the greatest economy under these conditions. Second, the adoption of speed



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ratings low enough to insure against the abuse of a machine under any average conditions which may be encountered. From a manufacturing standpoint, the latter scheme is far more practical.

"At the present stage of development, it must be assumed that the average driver will give his truck little consideration in the matter of abusive speed unless considerations of personal discomfort are involved, and the maximum speed of which a truck is capable must be placed low for this reason.

"Average street conditions have more to do with truck ratings than any other one feature. If a truck were to be operated only upon smooth boulevards a much higher rating might be adopted than is practicable under present average road conditions.

"In consideration of the average carelessness of truck operators, average road conditions and many other variables which enter into the question, we have adopted the following loaded speed ratings as most conducive to all-over economy:

½ ton truck 12 miles per hour.
1 ton truck 10 miles per hour.
2 ton truck 9 miles per hour.
3½ ton truck 8 miles per hour.

* * *

Suggests Two Speeds, One for City, One for Country.

C. Biederman, of the O. Armleder Co., Cincinnati, Ohio, suggests two speeds, one for the city and another for the country, in the following letter:

"The N. A. A. M. speed standard is very good for all city work.

"Judging from the writer's experience, it is necessary to have two kinds of speed tables—one for city work and others for long trips and country work.

"It is not very inviting to see a large machine traveling on a good road at a very slow pace.

"Most of the trucks are geared so slow that the engine is continually racing, and its life is shortened.

"It might be best, under the present conditions, to uphold the standard speed. However, as soon as good, responsible men are available, the speed of certain trucks should be increased, and the motor speed decreased."

* * *

Might Increase N. A. A. M. Speeds in Certain Cases.

L. J. Adams, secretary of the Adams Bros. Co., Findlay, Ohio, believes that in certain cases the speed of a motor wagon may be economically increased above the N. A. A. M. standard. He says:

"We are of the opinion that the speeds approved by the N. A. A. M. are about right, viz., 15 miles an hour for 1-ton, and 14 miles for 1½-ton trucks. This, you understand, would be the speed for the average truck. However, there are cases, such as newspaper delivery, etc., which require a little faster hauling in some instances."

* * *

Governor and Speed Marker are Needed.

Daniel E. Storms, general manager of the Sandusky Auto Parts & Motor Truck Co., Sandusky, Ohio, approves of the N. A. A. M. speeds, which, he says, "are about right." He continues as follows:

"It is going to be a difficult matter, however, to confine the average driver to these speed limits, unless you can put on a governor and a speed marker (to take care of the machine when it is coasting), both of which are securely sealed so that the driver cannot tamper with them.

"It is a sorry spectacle to see a heavy truck bouncing along the street or road at pleasure car speed. Men who are accustomed to drive pleasure cars should not be given a truck run. The man who is used to running a pleasure car, unconsciously wants to put his truck through the paces as fast as he did the pleasure car. We have particularly noticed this among our men who are testing out our cars. I would rather take a man off of an ice wagon, or any kind of a horse delivery wagon, and teach him how to run a truck, than to take an experienced driver from a pleasure car. The reason of this is very plain. The man who drives the team thinks that he is going fast when he is on the truck, and he is, as compared to the speed made with the horse drawn vehicle. But the man who has been driving the 50, 60 or 70 mile per hour pleasure car thinks he is going very slow when he is on the truck, and he is, as compared with his former speed.

"The buyers of trucks will solve the speed problem when they find out that if they permit their drivers to race along at 20, 25 or 30 miles an hour that it puts their trucks in the repair shop, and in less than half the time they are compelled to purchase new trucks to replace the ones that have been shaken to pieces by the abuse of their drivers.

"Experience only will teach the hard-headed business man the necessity of moderate speed. No truck carrying 1,500 pounds or more ought ever to be run, whether loaded or empty, to exceed 15 miles per hour. Of course, the larger the truck, the less the speed"

* * *

Most Troubles Due to Overloading.

W. H. McIntyre, president of the W. H. McIntyre Co., Auburn, Ind., agrees with the speed recommendations of the N. A. A. M., but considers that overloading is a greater nuisance than overspeeding. He says in part:

"We could tell you of experiences where dealers have made complaint, and where we have followed up these complaints, we have found that practically three-fourths of motor wagon troubles are chargeable to serious overload. We have followed the practice of applying governors to the motors. In 40 per cent of the troubles reported, we know that the governor had been put out of commission by the user on the claim that the motor speed together with the gear ratio did not give him the mileage he wanted.

"We are not inclined to believe that the speed as shown in the table is excessive for the rated load, but we would like to know how to prevent an overload and we would like to know how to prevent excessive speeding. Of course, I know that this matter should be explained to the user and he should take it up with the operator. Now back of all there is a dealer that should look after it, but many dealers apparently do not have the necessary backbone to insist and see that their truck receives the proper treatment.

"I am anxious to know how the other manufacturers handle this trouble."

* * *

Greater Uniformity Needed Among Makers' Speeds.

J. G. Perrin, chief engineer of the Lozier Motor Company, Detroit, Mich., brings up an important consideration when he shows that the fixing of high speeds by some makers to a certain extent forces the hand of other manufacturers to do likewise, in order to make a good mileage showing in competitive demonstrations. Says Mr. Perrin:

"From our experience with overloads and excess speeds we are convinced that for a 5-ton truck a speed of 9 miles per hour would be about right. Should a truck of this size be loaded with less than 5 tons, of course, it could be driven faster than 9 miles per hour, without abuse on tires, but manufacturers have got to meet the possibility of a 5-ton truck being loaded with 6 and even 7 tons spasmodically, and on such occasions the tires would be overloaded, both from weight and speed, if the truck had a greater speed than 9 miles per hour.

"For trucks of less than 5 tons capacity I think higher speeds would be permissible and would estimate that for 2½

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and 3-ton outfits a speed of at least 13 miles per hour could safely be allowed.

"But it is difficult for a manufacturer to rate trucks at too low a speed, unless there was a general standard for all to adhere to, as at the present time if a certain make of truck was limited to 9 miles per hour and some other make of perhaps equal merits had a capacity of 12 miles per hour, a prospective purchaser who had not had a great deal of experience with motor trucks might consider the greater mileage capacity an important feature, and this would be a factor in determining the sale of the machine. It would certainly be a good thing to have a standard established along this line."

* * *

Difficulty in Limiting Speeds of Heavy Trucks.

R. McA. Lloyd, vice president of the General Vehicle Company, Long Island City, N. Y., contributes a pertinent opinion regarding the speeds of heavy power wagons. His letter, in part, is as follows:

"While we have no serious objection to the N. A. A. M. speeds we realize that there may be some difficulty in limiting 5 and 6-ton trucks to 9 and 8 miles per hour, respectively. A number of well known 5-ton gasoline trucks are running with governors which permit of a speed up to 10 or 11 miles per hour."

* * *

Users Want Increased Speeds.

M. L. Pulcher, general manager of the Federal Motor Truck Company, unconsciously gives the proposed M. W. U. A. a boost when he points out the need of education among motor wagon users. His letter follows:

"We beg to advise that our trucks have been running at the N. A. A. M. recommended speed for a year and we find it to be absolutely satisfactory.

"Some of our new users think the speed is not great enough. They ask for more speed, but after they run the car for a while they seem to be mighty well pleased with 15 miles per hour. We have refused orders on which intending purchasers would not take a governor.

"In our lay-out the motor turns 1,000 revolutions per minute. The governor is attached to the camshaft and runs half engine speed. Our ratio from the engine to the rear wheels is 7¼ to 1, which gives us 15 miles per hour with 36-inch wheels."

* * *

Kelly Would Increase N. A. A. M. Speeds.

O. S. Kelly, manager of the Kelly Motor Truck Company, Springfield, Ohio, advises somewhat higher speeds than those recommended by the N. A. A. M. The Kelly company makes 1, 2 and 3 ton machines, for which speeds of 18, 15 and 12 miles per hour, respectively, are stipulated.

* * *

Different Speeds for Pneumatics and Solids.

F. W. Stewart, manager of the Truck Department of the Chicago Branch of the Buick Motor Co., agrees with us about the impossibility of settling offhand the speed question. His thoughtful letter follows:

"The question of speed for motor trucks is one in which the conditions vary so radically in different sections of the country and under different conditions that we do not believe it is practical to lay down any fixed rules in an effort to control drivers of the different capacity trucks.

"It is our policy to object very seriously to maximum speed of over 20 miles per hour with pneumatic tires or 15 miles per hour with solid tires, but every one of our trucks in use at the present time has for short distances exceeded this limit, and, in fact, will continue to do so.

"We do not believe that a truck of one ton capacity should ever be driven over 20 miles per hour even for a short distance, when equipped with pneumatic tires, over any roads or with a full load, and if we thought that the average driver would exceed this limit we would gear the truck to a higher gear ratio in order to allow the maximum speed to be reached without the necessity of the motor turning over at more than 1,500 revolutions per minute.

"We believe this is a matter that will take considerable discussion and a great deal of thought before being able to arrive at a definite speed at which all trucks should be operated under the big variety of conditions encountered in this class of business."

* * *

Good Results With Slow Speeds.

J. W. Brown, manager of the Couple-Gear Freight-Wheel Co., Grand Rapids, Mich. (makers of straight electric and of gasoline-electric motor wagons of various kinds, including four-wheel-drive, four-wheel-steer, and front-wheel-drive), says:

"We are inclined to feel that the speeds recommended by the N. A. A. M. convention are a little high in the smaller sizes and a trifle low in the larger sizes.

"We have had no experience in the small sizes, but with our 3½-ton wagons we find that a speed of 8 miles under load and 10 miles when empty is productive of better results than the higher speeds. Our 5 and 6-ton loads when carried at 7 miles per hour bring good results, and the upkeep is much lower than when we push them to 8 or 9 miles.

"Then 8, 9 and 10-ton loads, where roads are good, move along at 6 miles when loaded and return empty at 8 miles speeds with practically as little upkeep as there would be in running at 5 mile speeds when loaded. So far our 10-ton equipments have been used only on paved streets and naturally a 6-mile speed is considered slow. We presume, however, that for the average type of truck the speeds recommended are not far from right."

* * *

Too Slow in the Lighter Models.

Morton H. Luce, manager of the Chicago Branch of the Velie Motor Car Co., advocates somewhat higher speeds than those in the N. A. A. M. table for models up to 3½ ton capacity. He says:

"We believe that the speeds of the 4½ to the 10-ton trucks, varying from 9½ to 5 miles per hour, are correct; however, the speeds of the ½-ton up to the 3½-ton are too slow. A 3-ton truck as a maximum should never run, from a profitable standpoint for the user, less than 12 to 13 miles per hour. The 1 to 1½ to 2-ton truck speeds should be increased.

"In the sale of motor vehicles for truck purposes we must consider a saving cost for the user, and believe this slight increase of speed for low rated trucks is not excessive, and would be of advantage not only to the truck maker but to the user."

* * *

Mercury Advocates Lower Speeds.

G. W. Bulley, manufacturing manager of the Mercury Mfg. Co., Chicago, is an advocate of lower speeds than those recommended by the N. A. A. M. This is interesting to the editor of this journal, for he has often ridden for a mile or so in a pleasure car, directly behind Mercury machines belonging to a concern that employs a big installation of them, and on several occasions the speedometer showed 30 miles an hour. Furthermore, a member of the operating company later informed the

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writer that up to the present time there had been no tire troubles worth mentioning. Mr. Bulley's letter is as follows:

"We have had experience with rigs up to 2 tons capacity only. From our experience we would reduce the N. A. A. M. speed per hour, up to 2 tons capacity, at least one mile."

* * *

Subject Worthy of Most Careful Consideration.

Arthur W. Robinson, sales manager of the Truck Department of the Locomobile Company of America, and a keen student of motor wagon development, writes us as follows:

"Our experience has been with 5-ton trucks only, as this is the only model we are manufacturing at this time. The engine is controlled by a governor which is set to shut off at a truck speed of 10 miles per hour. This practically agrees with the speed recommended by the N. A. A. M. Their table calls for speed of 9 miles per hour for 5-ton trucks.

"We are very much interested in this subject and agree with you in deeming it worthy of the most careful consideration."

* * *

Compromise Between Work and Maintenance Cost.

E. R. Whitney, chief engineer of the Commercial Truck Company of America, Philadelphia, Pa. (makers of electric wagons), states that lower speeds than those in the N. A. A. M. have been found economical in his company's experience. Says Mr. Whitney:

"After a number of years of experience we have adopted the following speeds as being the best from the point of view of ultimate economy:

"Half-ton, 15 miles per hour; 1-ton, 12 miles per hour; 2-ton, 10 miles per hour; 3½-ton, 9 miles per hour; 5-ton, 7 miles per hour. These are the capacities that we have had experience with.

"From our experience we would say that if the speed is made higher the cost of tire maintenance and general repairs will be greater per mile. If the speeds are made lower the trucks will not be capable of doing as much work for a greater length of time, and we have settled on the above speeds as being the proper compromise between the amount of work that truck will do and cost of maintenance."

* * *

Impossible to Sell Trucks of Low Speed.

Morris R. Machol, general manager of the Hydraulic Truck Sales Co., New York, distributers of the La-France gasoline-hydraulic power wagons, brings out the same point which is raised by several others of our correspondents—that it is impossible to sell motor wagons which are rated at slow speeds. Says Mr. Machol:

"We are selling what is practically a 6-ton truck and we note that the N. A. A. M. speeds give 8 miles an hour for a 6-ton truck. However, we would find it impossible to sell trucks if we tried to limit the speed to that amount.

"Purchasers insist upon having 12 miles an hour from a 6-ton truck, and that is what we give them. It is all very well to talk about limiting speeds of a 2-ton truck, say, to 13 miles, or a 1-ton truck to 15 miles, but the purchaser will not stand for it.

"When a man buys a 5 or 6-ton truck he wants it to give 12 miles an hour and he insists upon operating it at an average speed of 10 miles an hour, which means that 12 miles an hour would have to be exceeded in some places.

"We believe that it would be better if the speed of a 5-ton truck were limited to 10 miles an hour and the machine were to have a suitable governed engine so that it could not be run over this speed, but it is necessary to sell a man what he wants to buy."

* * *

Lower Speeds for Argo Electrics.

W. O. Sustins, chief engineer of the Argo Electric Vehicle Co., Saginaw, Mich., believes in speeds somewhat lower than those in the N. A. A. M. tables. Mr. Sustins writes:

"We would state that our experience has been with 1,000 and 2,000 pound capacities only. And for these two sizes of electric vehicles we would recommend speeds to be placed at 14 and 12 miles per hour, respectively."

* * *

Views of the Tire Makers.

In connection with another matter, we have recently received some interesting opinions from the tire manufacturers on this subject of motor wagon speeds. As might be expected, no two of these are exactly alike. We will not quote the writers, as their comments were given in confidence, but a few brief extracts will show the difficulties of the whole situation.

(1) "We do not recommend that any solid tire be operated at a speed greater than 15 miles per hour."

(2) "With regard to speeds recommended for various equipments, will advise that we consider a maximum of 10 miles an hour for a 5-ton truck; 12 miles an hour for a 3-ton truck; 16 miles an hour for a 2-ton truck; 18 miles an hour for a 1-ton truck; and 20 miles an hour for vehicles carrying less than one ton."

(3) "We are not encouraging speed in any sense of the word."

(4) This concern gives a table of speeds varying from 16 miles an hour for a 3-inch tire, to 8 miles an hour for a 6¼-inch tire.

(5) This concern agrees with the N. A. A. M. speed recommendations.

(6) "We have records of somewhat over 310 different designs of motor wagons, and regret to advise you that out of 310 there are not 3 that we know of that carry the same size and style of tire equipment (Compare the records of the 'Power Wagon's' specification tables for 1912.—Ed.). With some the speeds are entirely too fast. On others the wheels are too small. Again, on others the weight distribution is such that would compel you to use single front, and dual, or even triple, rear."

(7) "The driver of the vehicle should experiment and find the speed which has a certain amount of 'carry' so that if he should suddenly shut off his power without applying his brakes, the vehicle will continue for a certain distance before stopping."

* * *

Letters Show Great Variety of Opinion.

Testimony like the foregoing, gathered, it must be observed, after the N. A. A. M. speed ruling was passed by that body, and after our article on "Motor Wagon Speeds" was published, shows that the discussion on economic road speeds is only just started. We will be interested in noticing what further attention will be paid to the subject by the N. A. A. M., in view of this mass of conflicting opinion.

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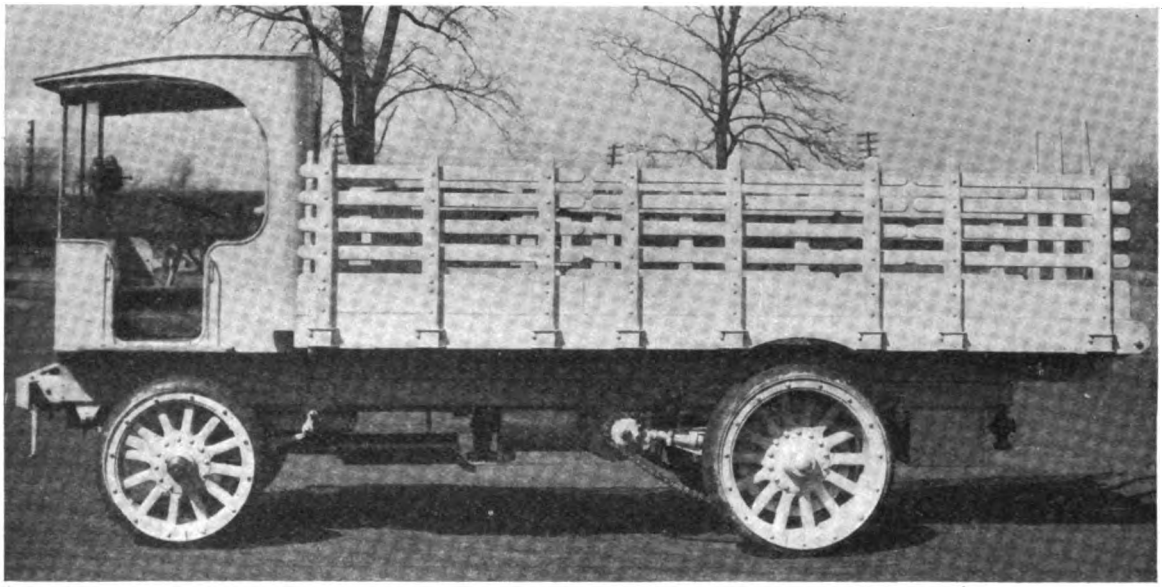
Garford

OPERATING EXPENSE rather than the initial outlay has become the bugbear of motor truck owners. The experience of the past three years has shown that the former amount is apt to be an uncertain quantity while the latter may be accurately computed. The right truck will put a balance on the profit side of the ledger, while an inferior machine with its attendant repair bills and loss of time and labor will prove more expensive than the old horse drawn method of transportation.



Garford Five-Ton Motor Truck

BUILT of the best material obtainable for the purpose, assembled by high grade machinists and having every part carefully inspected and tested before leaving the factory. Garford trucks may be operated with very nominal maintenance charges.

Accessibility—a feature which the designers of this machine kept constantly in mind—is a virtue that enables the Garford to remain in service while less carefully constructed trucks are being dissembled in the shop to allow repairs to be made. In the heavy duty Garford models the motor is placed between the two seats in the driver's cab and no cushions need be removed nor bolts unscrewed to reach it. It is not even necessary for the driver to leave the cab in order to make minor adjustments.

Tell us your transportation problems. We have data and testimonials that will be of interest to you.

The Willys-Garford Sales Co.
Toledo, Ohio

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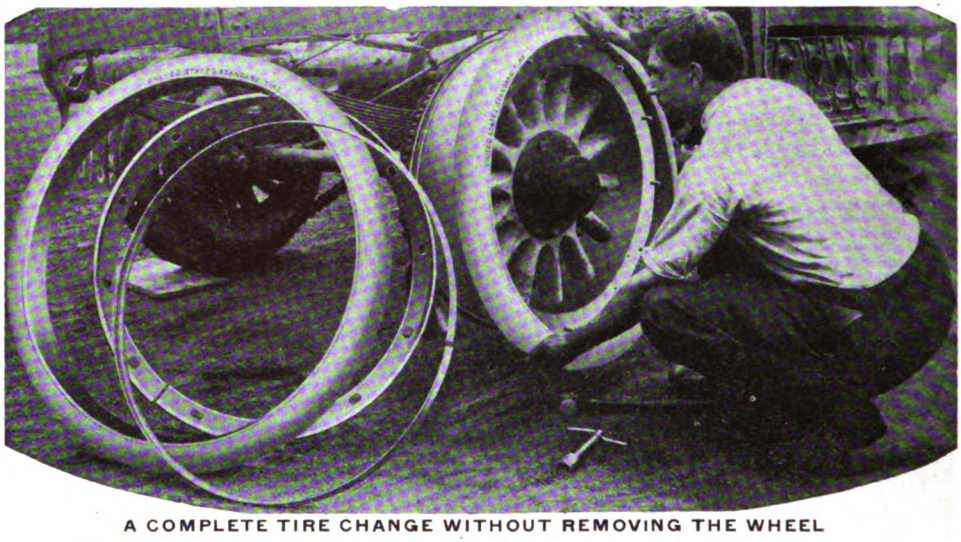
MORE PROFITS from your motor delivery system

is simply a question of getting more service and better service from your motor trucks—of eliminating such needless delays and losses as those occasioned by tire troubles.



A COMPLETE TIRE CHANGE WITHOUT REMOVING THE WHEEL

Business men and motor truck experts everywhere are rapidly coming to realize the tremendous advantages to be gained by equipping their trucks with

THE NEW UNITED STATES STANDARD MOTOR TRUCK TIRE (Demountable)

and thereby positively insuring them against the necessity of ever losing a single hour's service on account of tire troubles and tire replacements.

They are learning that this long-lived tire, with its 10,000 mile guarantee, has not only made tire replacements few and far between, but has made them a matter of a few moments' work on the part of the driver instead of a few days' layup for the truck.

The simplicity and convenience of the demountable equipment makes this tire an absolutely dependable part of your motor truck, enabling your driver to make a tire change anywhere in fifteen minutes' time; a change that would heretofore have required the laying up of your truck from two days to two weeks.

With the services of each truck you operate, worth from $15 to $25 per day, the *money-saving* possibilities of the new UNITED STATES TIRE are obvious.

If you have not yet seen our illustrated booklet, "A Revolution in Tires for American Motor Trucks," you ought to write for a copy today.

United States Tire Company

NEW YORK

BRANCHES, AGENCIES OR DEALERS EVERYWHERE

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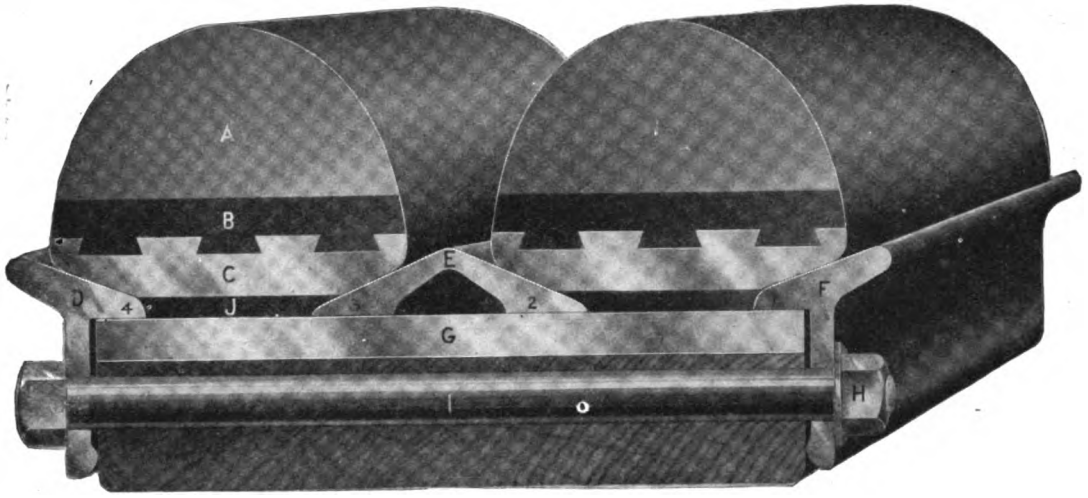
TRUCK MAKERS AND DEALERS

The tires on your trucks will help or hinder their sale

There is no denying the influence that tires have on the sale of motor trucks. Whether you are figuring on the sale of a "fleet" or a single machine, you are bound to encounter the questions of tire mileage and tire up-keep cost.



CROSS SECTION VIEW OF UNITED STATES STANDARD TWIN TIRE AND DEMOUNTABLE RIM

A—Tough Rubber Tread
B—Hard Rubber Base
C—Metal Base
D—Inside Flange Wedge Ring
E—Center Wedge Ring
F—Outside Flange Wedge Ring

The man of big business who uses dozens of trucks demands the *lowest tire cost per mile*, and installs an accurate system of tire cost accounting to see that he gets what he wants.

Tire cost to the man trying out his first installation is second only to his demand for continuous truck service. To tie up his delivery system for days at a time when a tire needs repairs or replacing, may cause him to decide against the use of motor trucks for his delivery work.

Both these tire problems are solved by

THE NEW
UNITED STATES STANDARD MOTOR TRUCK TIRE (Demountable)

This tire has an absolute guarantee for 10,000 miles —a lower guaranteed tire cost per mile than any other tire maker offers today

Equally important is the fact that this tire can be changed anywhere by the driver himself in fifteen minutes' time.

Can you imagine a more powerful argument in favor of your make of truck than to be able to absolutely assure your buyer that he will be guaranteed the lowest possible tire cost on his truck equipment (whether it be a single machine or a "fleet"), and that it will never be out of commission a single hour on account of tire replacements?

United States Tire Company

NEW YORK

BRANCHES, AGENCIES OR DEALERS EVERYWHERE

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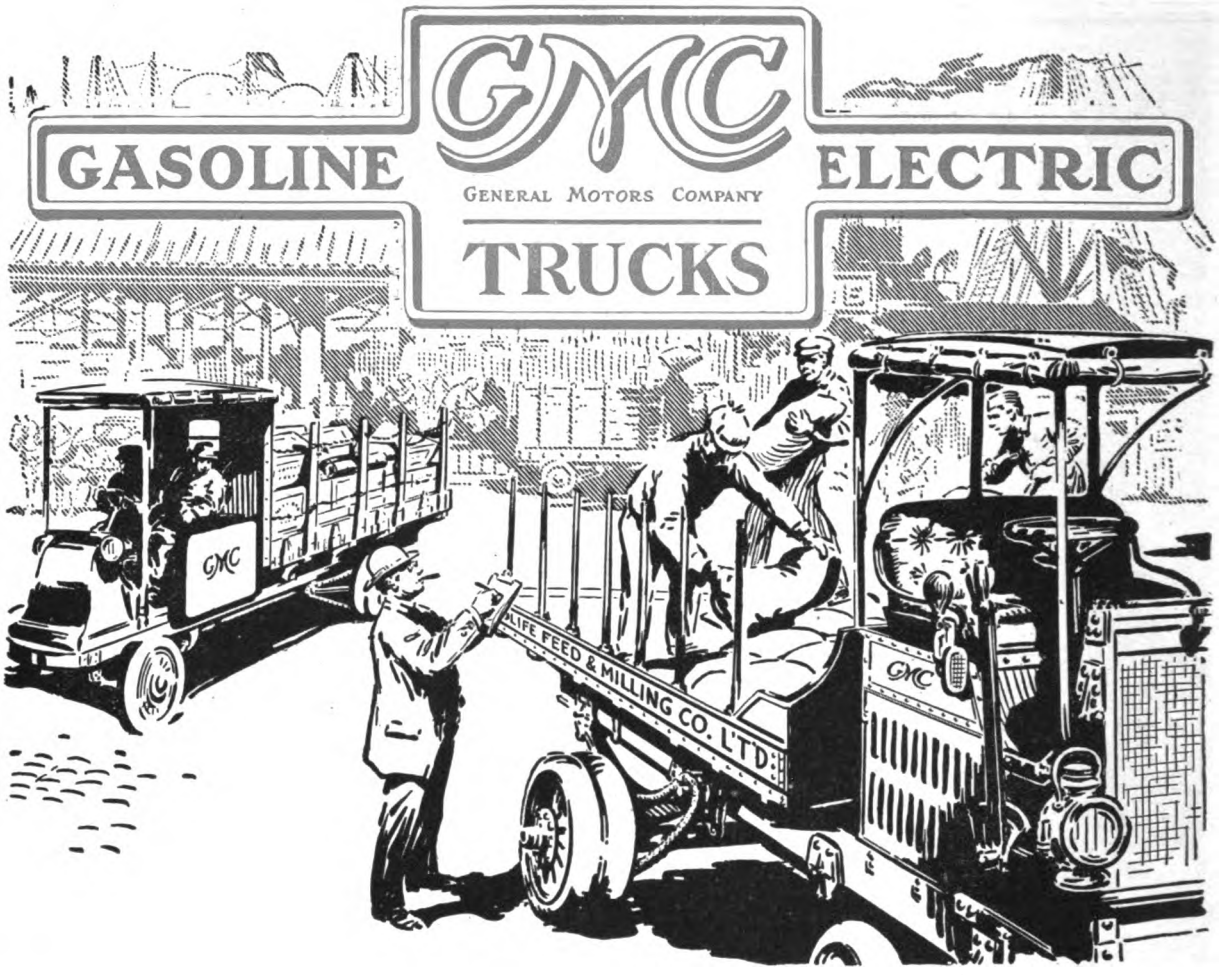

Standardized motor truck equipment

Modern "good business" system demands standardization because *standardization* means *simplification*— the straight road to efficiency and economy.

General Motors Truck Company is the *first* to standardize trucks by building both gasoline and electric types in capacities from 1000 lbs. to 6 tons.

As a truck user, or as a prospective buyer, whose business requirements may demand trucks of varying capacities, realize what truck standardization means.

You deal with *one* responsible manufacturer—the largest in the world.

The immense financial resources of GMC *guarantee its future*—and protect your trucks for "service" and replacements for years to come.

A "service" department at command night or day for quick replacements or emergency chassis.

Familiarity of caretakers and drivers with *one* line of trucks.

Constant inspection and reports to keep you posted on the exact condition of your machines.

Compare such standardized truck equipment with haphazard buying—light gas trucks from one maker, heavy gas trucks from another and electrics from a third.

Realize the *vital importance of these facts.* Consider them carefully, and *know yourself* what GMC equipment means to you.

Let us render *pre*-sale service that entails neither cost nor obligation, and will thoroughly analyze your hauling problem.

Both the gasoline and electric catalogs are instructive as well as interesting. They will be mailed upon request.

Correspondence from prospective purchasers and dealers is invited.

GENERAL MOTORS TRUCK COMPANY

DETROIT, MICHIGAN

Branches: New York, Chicago, Boston, Philadelphia, Kansas City, Detroit

Please mention the "Power Wagon" when writing to advertisers.

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BIG COAL COMPANY INSTALLS MOTORS.

The latest convert to motor wagon operation on a large scale is the City Fuel Company, of Chicago, which has just purchased 20 Saurer machines of 5-ton rating from the International Motor Company, the total investment being $100,000. The machines will be installed within four months from date. It has been calculated that these 20 machines will replace 150 horses, it being the practice of the City Fuel Company to haul its merchandise by three-horse teams.

The daily service of each machine will be from 40 to 50 miles. The daily load capacity of each machine will be about 50 tons, although in experimental demonstrations it has been shown that 70 tons a day is not too much to expect from the 5-ton motor truck in coal service in Chicago.

The length of individual haul for the machines will never exceed 2½ miles, and 8 round trips will be considered a fair days' work.

In anticipation of this investment in motor trucks, the City Fuel Company some time ago purchased an ideal site for a motor garage, located at 21st and Dearborn streets. This was recently occupied by the power plant of the Chicago City Railway Co. The building is capable of housing 150 motor wagons of the largest dimensions, and its purchase may be regarded as reliable evidence of the City Fuel Company's intention to completely motorize its transportation system. At present the company has about 500 horse drawn wagons which at present serve 45 yards, the annual tonnage being in the neighborhood of 2,000,000 tons of coal.

The machines will be directed to serve the company's steam coal yards which are located in two divisions of the city—the north and south side.

It is highly probable that all of the yards of this service will be provided with mechanical loading devices—clamshell hoists, portable hoppers, etc. Economical appliances of this sort are absolutely indispensable if the City Fuel Company is to obtain the maximum of economy in the operation of its motor wagons.

The wages of drivers will vary from $18 to $20 a week, but no helpers for loading or unloading will be supplied. The internal administrative system will be in charge of a competent executive, whose ability will be certified by the International Motor Co. It is believed that about 40 per cent of the equipment will represent the European design of the Saurer model, while the remainder will be wholly of American origin.

ANOTHER PROFESSIONAL IN CHICAGO.

The Star Motor Delivery Company has been incorporated with a capital of $75,000 to do professional power wagon haulage business in Chicago.

The company will install a fleet of 50 machines of all load ratings from 1,500 pounds up to 10 tons. Most of these will be Mack motor wagons, the balance being probably Saurer and Hewitt machines, all of which are marketed by the International Motor Company.

A central garage will be erected in the near future, and haulage contracts are already being closed with Chicago merchants. Contracts will be for three years, charges being made on a per diem basis, and machines will be leased on this plan. Bodies will be supplied to meet special requirements and with the customers' names painted on them. The Star company will supply the drivers and assume all the burden of upkeep, administration and garaging of the machines.

E. Graham Rhoads, formerly manager of the Chicago Branch of the International Motor Company, will be the general manager of the new concern.

ANALYSIS OF MACHINES IN N. Y. PARADE.

After our article on the New York motor truck parade had gone to press, we received from Charles E. Stone, secretary of the New York Motor Truck Club, the following particulars which were noted by him at the reviewing station at 100th street:

Number of 1,000-pound trucks	15
Number of 1-ton trucks	46
Number of 1½-ton trucks	70
Number of 2-ton trucks	19
Number of 3-ton trucks	85
Number of 4-ton trucks	23
Number of 5-ton trucks	71
Number of 6-ton trucks	7
Number of 7-ton trucks	5
Number of 10-ton trucks	10
Number of fire engines	1

These were analyzed as follows:

Transmission: hydraulic, 2; friction, 3; gas-electric, 8; planetary, 13; balance, progressive sliding gear and selective types.

Drive: Chain, 259; shaft, 74; worm, 9.

Steer and control: Left hand, 44; right hand, 308.

Position of motor: Under floor, 5; under seat, 170; under hood, 127.

Number of machines with chains inclosed, 16.

Motors: Air-cooled, 6; 2-cycle, 6; 1-cylinder, 3; 2-cylinder, 70; 3-cylinder, 6; 4-cylinder, 223.

Type: Electric, 50; gasoline, 302; semi-trailer, 9.

Foreign machines entered: English, 4; French, 2; Swiss, 12; German, 16.

The British post office augmented several motor mail services during the recent coal strike.

The Franklin Coal and Building Supply Company, recently organized in Columbus, Ohio, will make all its deliveries in power wagons.

"One hears," says the "Commercial Motor," of London, England, "that self-starters will be started before long upon several commercial-motor models."

Recently two motor cabs were chartered to carry a couple of proof pages of the new George V Bible from Cambridge to London, England, the second machine being used in case of a breakdown of the other.

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Electrics in New England.

New England Seems Unexplicably Opposed to the Use of Electric Motor Wagons.

By WILLIAM P. KENNEDY.*

IT MAY well be conceded that after ten years' successful employment in economic service the electric vehicle has ceased to be an experiment and is as well developed as most of the industrial apparatus which we are at present using in commercial life as absolute necessities to present day conditions. We may be well convinced of this when we consider that the electric vehicle, particularly in its industrial application, is nothing more than a modification of the electric street car, having the same engineering foundation for its design and production.

With the practical example of nearly 5,000 commercial electric vehicles and over 15,000 pleasure vehicles in successful employment there is today considerable wonder that they are not more universally employed, and the conditions tending to obstruct their almost universal application are well worth studying with the object of eradicating whatever impediment there may be and giving such impetus and propagation to their use as to establish in the minds of prospective machine users unquestionable confidence and an inclination to substitute them for the present or existing horse methods with the remarkable reduction in operating expense which would accompany the change.

* * *

Four Factors which Boost the Electric Wagon.

That progress towards their general use is not more active is further accentuated when we consider the four large and powerful influences at work in co-operation to stimulate their employment. These are the makers of the complete vehicles, the manufacturers of the accessory electrical apparatus required in their equipment, the manufacturers of storage batteries, and the public service companies furnishing current.

* * *

Statistics of the Electric Vehicle Industry.

A general inspection of the progress made so far shows that up to September 1, 1911, there had been put into service over $10,000,000 worth of electric wagons, and $30,000,000 worth of electric pleasure vehicles; and 30 per cent of this total was put into service in the twelve months preceding this date. This latter year's equipment included 1,000 motor wagons and 5,000 pleasure cars, amounting in value to $12,500,000. For the six months between December 1, 1911, and March 1, 1912, indications are that last year's business will be exceeded by 50 per cent, or in other words, by September 1, 1912, we are safe in asserting there will be in use nearly $60,000,000 worth of this class of apparatus. Incidentally, the total annual current consumption for this equipment will be over 65,000,000 kilowatt-hours, and if this latter may be valued at 4 cents it would represent $2,600,000 annual revenue to public current supply companies if it were possible to serve this entire equipment from central stations.

* * *

Reorders Comprise 70 Per Cent of Electric Wagon Business.

A peculiar feature of the increasing business, however, is the fact, generally admitted, that for the past two years nearly 70 per cent of the electric wagons put into service were purchased by firms already using this type of motor wagon, so that the gain in new business secured by manufacturers represents only about 30 per cent of their total output.

This indicates two things, which are somewhat difficult to reconcile. One is that this type of machine is so economically successful as to warrant continual increase in the equipment already in use, and the other contrasting feature is that notwithstanding this convincing example to the industrial and mercantile community it does not create a proportionate desire on their part to avail themselves of this economic apparatus.

* * *

Brewers and Express Companies Biggest Customers.

Notable among the recent increase of established installations has been the addition within a few months of about 200 machines to the brewing industry and 200 machines to the express business, with expected addition within the next six months of 200 more machines to the brewing business and 500 machines to the express line. This indicates that those organizations in which transportation is a serious and important part of their business, they have recognized the utility and economy of the machine and are superseding as fast as they practically can their existing horse equipments.

* * *

New England Behind in Use of Electric Wagons.

It may be locally interesting to know that while there are between 4,000 and 5,000 machines used elsewhere, Massachusetts is at the present time employing only 170, of which 87 are in Boston proper and 111 in Boston and its immediate vicinity; and the total for New England would probably not exceed 200 electrics, while there appear to be in the same district 1,800 gasoline motor wagons. The apathy of the New England district is the more conspicuous in view of the fact that no corresponding territory has had expended upon it anything like the same amount of intelligent and persistent effort to educate the prospective users in the benefits to accrue from the use of these machines, as well as to stimulate effort on the part of those engaged in advancing the propaganda.

* * *

How to Improve the Situation.

If this situation is to be improved we must broaden our efforts and invite the co-operation of not only those immediately interested in the sale and use of machines, but every other influence at work in promoting the em-

*A paper read before the Electric Luncheon Club, Boston, March 15, 1912.

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ployment of electric utilities. Those engaged in advancing street car service, elevator installations, industrial motor equipment or telephone and telegraph communication should have a common purpose to take this new and sturdy industry by the hand and encourage public intimacy with it to such a degree that the electric vehicle may become as much a prevalent utility as any of the public's present electrical necessities.

The more we encourage the public habit of using electric vehicles or electrical service in any form the more we stimulate the general interest with corresponding reflex individual benefit to its various other divisions.

* * *

The Impediments to Progress.

The present impediment to progress in this direction is a lack of familiarity with the real simplicity of the problem. There is an inclination to surround electric vehicle employment with a good deal of unwarranted mystery and to lay stress on minor non-essential items which may happen to be questionable at the moment instead of looking broadly at the conspicuous advantage which machine use possesses.

A serious consideration before us as sober-minded sponsors of the transition taking place is whether the introduction of machines is being accomplished with such active efficiency as to stimulate rapid increase toward their universal employment, or whether the present or prospective users have entirely shaken off their inherited customs and conservative prejudices in favor of what they have been used to as against the advantages to be derived from a different practice.

* * *

Horsemen Do Not Know Their Own Operating Costs.

Among the greatest difficulties which we encounter in this work is an almost complete absence of knowledge on the part of the users of horse service as to the cost of their transportation except in the few cases where the service is hired or transportation is the principal part of their business, but until the advocates of motor vehicle employment attempted to make the substitution of machines for horses on an economic basis, it is a fact that reliable horse transportation costs were unknown to the average merchant. The necessity for this information is being now recognized by them and they are gradually informing themselves, although the subject is usually handled in a very crude way.

It has been astonishing to most of us to discover the resentment which exists on the part of the merchant to consideration of the details of his wagon service department. He has been accustomed in the past to delegate this to some minor subordinate and entirely forget it himself, so that when we bring up the subject and he has to face the music of hearing his actual cost and the saving which might be made by the employment of electric vehicles we usually find him in an irritated attitude.

* * *

Merchants are Hard to Convince.

Again, even where we find the prospective user inclined favorably to consider machines we discover a strong disinclination to change the method which has been convenient with the use of horses, to any new scheme of operation which may be necessary to utilize the capacity of the machine.

There are also existing obstacles at loading and unloading points, which are the great causes of waste in any system present or future which must be eradicated before long as a economic necessity, even independent of the use of motor vehicles.

Last, but not least, we are confronted with a prevalent suspicion on the part of purchasing executives that the presentation made to them regarding the economy of electric vehicles is too good to be true. They have been so accustomed to the glowing and unsubstantiated representation made to them as prospective purchasers of gasoline pleasure cars that they fail to distinguish the facts which exist in favor of a commercial device.

* * *

Costs of Operating Electrics are Well Known.

We have several splendid advantages in presenting economic facts in relation to the cost of operating electric machines on account of the fairly accurate records which have been kept, particularly in large installations over long periods covering upkeep of the wearing mechanical parts, batteries and tires, and these three essentials are after all the only items that are subject to the slightest doubt in presenting the cost of operation.

For the purpose of putting some fact forward to substantiate the generally accepted knowledge among us that remarkable economy may be effected by the substitution of machines for horses, the attached table is presented, showing the results of some very complete and exhaustive investigations made with a long period of time devoted to each case and adequate facilities afforded to arrive at an exact knowledge of existing horse cost and to demonstrate beyond question to the prospective purchaser the performance and the cost of operation of the proposed machine equipment. These cases are selected at random from a large collection and represent the transportation departments of prominent and well known commercial institutions in several of the principal cities. The names are omitted purposely as otherwise this information could not be presented.

Two classes of service are covered in this tabulation, one representing haulage of heavy loads requiring vehicles of two and five ton capacity and the other group representing medium service where the vehicles are largely composed of ton and half ton machines as well as some larger sizes in minor quantity.

The principal feature intended to be developed by the presentation of this table is the value of saving to be made and its proportionate relation to the existing cost and to the investment necessary to bring about the reduction. It is also interesting to note the proportionate relations between present horse investment and machine investment, as well as the ratio of machine expense to horse expense.

The figures relating to horse equipment are certified to as correct by the respective owners of the installations and the machine equipment has been determined

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in every case after a complete consideration of the characteristics of the work and extended demonstration with the actual use of machines to prove that the expected accomplishment was practicable. These demonstrated results have been agreed to as convincing and satisfactory by the interested executives in every case, and therefore the entire matter is as nearly fact as it is humanly possible to develop it.

Horses.	Machines.	Investment—Horse.	Investment—Machine.	Expense—Horse.	Expense—Machine.	Annual Saving.	Earnings in % of Investment.	Saving over horses in %.
HEAVY SERVICE.								
75	44	$ 94,551	$166,733	$136,746	$113,087	$23,660	14.2	17.5
30	11	26,615	36,584	44,198	28,378	15,819	43.2	35.7
16	5	7,975	17,784	15,587	11,557	4,030	22.6	25.8
121	60	$129.141	$221,101	$196,531	$153,022	$43,509	19.6	22
Relative Proportions—								
(1 : .5)		(1 : 1.70)		(1 : .77)				
MEDIUM SERVICE.								
35	31	$ 36,485	$ 83,003	$ 91,530	$ 70,663	$20,867	25	23
17	10	14,300	23,500	29,074	18,972	10,102	42.9	34
33	20	21,848	51,126	50,249	38,444	11,805	23	23.3
21	14	39,778	46,170	41,593	31,802	9,791	21.2	23.5
48	37	54,095	75,598	115,284	75,745	39,539	52.3	34.2
154	112	$166,506	$279,397	$327,730	$235,626	$92,104	32.9	28
Relative Proportions—								
(1 : .72)		(1 : 1.67)		(1 : .72)				

BOSTON'S MAYOR IS A BOOSTER.

Mayor Fitzgerald, Boston, Mass., has sent letters to the school committee, the trustees of the Franklin Union, the Wentworth Institute, and the Boston Y. M. C. A., asking each to cause to be installed in their schools a course in motor wagon handling.

The mayor's letter stated that if this industry is given encouragement in the schools where the boys get started in their life work, it will furnish a means of occupation for a large number of the boys now being turned out of the schools with half-trained minds and their hands not trained at all.

The mayor predicts that the handling of power wagons in Boston will increase enormously during the next year and that to meet and help this increase, the schools should aid the growing boys.

The mayor believes night courses in this line will be most beneficial.

MOTOR WAGON BOOM IN CALIFORNIA.

J. G. Mansfiel l, head of the motor vehicle licensing department of the office of the secretary of state of California, is responsible for the following good news from his section of the country:

"During the past six months the number of motor trucks in California has increased by at least 25 per cent. At first they were used only on good level pavement. Now they are hauling heavier loads than the best draft teams could pull, up hills so steep that horses were scarcely able to go up with a half load. They are using the power of the motor to unload and load, so that a great deal of time and energy is saved the driver. Against that situation the work horse is not going to have any chance.

"Take one example of the way business men are adopting the motor truck. The Burr Creamery company of Los Angeles sent in for licenses for 30 light delivery trucks in one day. Then some highly trained horses lost their work when the Southern Pacific company, wanting to equip and repair its trolley system in Alameda county, bought motor-driven 'tower wagons.' Those are the wagons with the elevated platform carrying men who repair the trolley wire, and must be moved quickly. The motor fire engines and truck wagons are in the same class."

LONDON TAXICAB DISPUTE.

The committee appointed during the strike of London taxicab drivers in November last, to consider the questions in dispute between the proprietors and the men has now given its award, which is very strongly in favor of the men.

The three main points in dispute were the question of sharing the "extras" between proprietors and men; the proportion of takings which should be allotted to the drivers, and the price at which gasoline should be supplied by the companies to the men. The award is as follows:

(1) The drivers are to take the whole of the extras. Prior to the strike they only took 25 per cent, but on the resumption of work in November they agreed to pay a fixed rate of 6d. (12 cents) a day for the extras, which then became their own.

(2) Drivers' share of takings, other than extras, to be 25 per cent. This is the same as before.

(3) The employers are to supply gasoline at the rate of 8d. (16 cents) a gallon, and unless the price of gasoline goes up more than 12 per cent, they cannot increase this charge.

Various other matters, such as liability for "bilking," waiting allowances, uniforms, etc., are settled, generally to the advantage of the men. The general verdict of the proprietors is that the award is very unfair to the companies.

The question of allowing an increase in fares to compensate for the concessions to the men was not decided.

Drivers of municipal fire motors and ambulances in Minnesota need not take the examination for a chauffeur's license.

The General Omnibus Company of Paris, France, has installed several motor buses to take special care of theater goers after the show.

The Companhia Paulists Auto-Carris with a capital of $100,000, has been formed in Sao Paulo, Brazil, to run an automobile service in that city.

An English concern owning several motor trivans has established the record with its oldest machine of 58,564 miles in three years, at a total inclusive cost of 4.3 cents a mile.

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A single day's shipment of motor wagons from the plant of the Packard Motor Car Company.

IMPORTANT SUGGESTION TO DEALERS.

Talk about having "silent agents,"—here is a woman booster of motor delivery, and probably there are many more of them. We quote from the Minneapolis "Journal" of April 7, 1912:

An odd source for an automobile prospect came to light over the telephone Thursday at the MacArthur-Zollars-Thompson Company offices, 1301 Nicollet avenue.

"I would like to speak to the manager," said a woman's voice over the telephone. A. E. Thompson, president of the firm, answered.

"Do you sell automobile trucks, suitable for light deliveries?"

"Yes, Miss," was the reply. "We are the agents for the Veerac truck, valveless, air-cooled and has a capacity of 1,500 pounds. It costs $850, is a two-cycle eng—"

"No, never mind about what it is," replied the woman. "You know I don't want to buy one myself, but I want you to take a few names of the merchants who deliver goods at my home every day. I want you to send them your catalog and a personal letter, using my own name if you want to. All last summer I stood for having the boulevard and lawn in front of my house kicked up and the grass eaten and the trees chewed by the horses on delivery wagons and today, for the first time this year, I saw one delivery horse trying to do the same thing again, just as the grass is beginning to sprout. I won't stand for it this year. Here are the names."

Mr. Thompson took the names of several merchants who still have horse-drawn delivery wagons and promised the Hennepin avenue matron that a letter would be mailed to each.

By the way, the idea that has occurred to us in this connection is—Why cannot the local power wagon factors in the various cities organize a regular Ladies' Motor Delivery Booster Association to do as this lady did? A few direct hints by the ladies to the merchants will work wonders in this age of competition. Try it.

Dover, Del., has raised the speed limit for motor vehicles from 6 to 12 miles an hour.

So far 18 makers are represented in the forthcoming army motor trials in France. The figures for 1911, 1910 and 1909 were 14, 11 and 9, respectively.

SHOWS TRUCK BUSINESS IS GOOD.

This picture shows one day's shipments of Packard trucks which left the factory on March 30.

The Packard Motor Car Company says it is now receiving more repeat orders from critical big buyers than at any time since starting in the truck business. Shipments in March were 85 per cent larger than any previous months, sales in March were 50 per cent greater than the corresponding month last year. The new truck shops are now in full swing with an output of five heavy duty vehicles every day.

POLICE OFFICIOUSNESS IN NEW YORK.

Motor wagon dealers and manufacturers are very much incensed over the recent arrest of Frederick Kurtz, the driver of a Pierce-Arrow demonstrating truck, by Policeman John Mesele in Brooklyn, and as a result a formal complaint has been lodged with Police Commissioner Waldo by the Automobile Dealers' Association.

Kurtz, who was driving a new power wagon around for the purpose of explaining its principles to Pierce-Arrow customers, was arrested by Mesele, who gave as an excuse for the arrest that he thought the machine did not bear sufficient evidence of hard work to warrant carrying a manufacturers' license plate. Kurtz was summoned to court in Brooklyn on April 9 and 10, being held on the second day.

The case was dismissed by Judge Hylan at the Fifth District Court, Brooklyn, April 12, after it was shown that the case had been thoroughly explained to Policeman Mesele, making the arrest altogether unnecessary. In the complaint to Commissioner Waldo it was pointed out that the unnecessary officiousness of the policeman making the arrest had caused a loss of three days' work for both the chauffeur and vehicle.

British motor wagon users are seeking parliamentary permission to lay gasoline pipe lines from the Thames estuary to various centers in London.

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Motor Wagon Publicity.

Again We Point Out the Futility of "Contests" and "Stunt" Performances.

PUBLICITY precedes salesmanship. and then goes in hand with it afterwards. But to be really effective, publicity besides merely compelling notice should also make people think. When a potential buyer has actually been brought to the realization that he is losing something by not being in possession of the article the manufacturer has to offer, the way is made much easier for the salesman to go in and do business.

* * *

Chicago to New York Run Would Be a Waste of Money and Effort.

A motor wagon demonstration between Chicago and New York, for example, would create a lot of public notice, and would obtain many columns of newspaper publicity for the promoters and participants. But if the sole object of the run were only to show that a fleet of motor wagons could make the journey successfully, it would prove little or nothing that is not already known, for such a feat has been done before by several machines.

To the ordinary merchant owning horse drawn wagons it would prove nothing. It would not make him think. For no one is such a fool as to route freight 1,000 miles by road when hauling over such a distance can be done so much cheaper by railroads.

* * *

Test Should Prove Something of Real Value to Merchants.

In other words, mere circus stunts avail nothing to the man whose business it is to make or sell motor wagons, at least not at this advanced stage of the industry. Everybody knows that a motor wagon will stand up under conditions that would prove insurpassable to the horse, and that the machine will go further, travel faster, carry more load and keep on doing it without fatigue. But that is not what vitally interests the business man who partly or wholly makes his living out of transportation. What he wants to know is how the power wagon will fit into his business to supersede the horse profitably. He does not want mere hearsay evidence; he must have facts and figures that suit his conditions of doing business.

* * *

The Chicago Automobile Trade Association's Demonstration.

It was with these things in mind that the Chicago Automobile Trade Association during the week preceding the motor wagon section of the recent Chicago Automobile Show arranged a demonstration of power wagons in actual service in Chicago. This was carried out with the object of showing the merchants of Chicago what motor wagons are actually doing in local daily service; not to pit one make of machine against another, not to ascertain whether a power wagon could do things that not one person in a million would ever dream of making it do, but to record simply and truly the daily performance of hundreds of motor wagons in their ordinary work of carrying merchandise under purely local everyday conditions.

In such statistics are merchants vitally interested; to some they point the difference between mediocrity and real success; to all they mean a chance to improve their methods of doing business.

An account of this demonstration was given in the "Power Wagon" of March, 1912.

* * *

Chicago Men Considering Plans for Record Demonstration.

In spite of the fact that the whole thing was done somewhat hurriedly, the Chicago Trade Association's demonstration received favorable comments in the city and in trade circles generally. The result is that some of the members of the association are considering a plan which amplifies largely on the original idea, and it is possible that before very long another and more convincing test will be conducted by the same interests. The men behind this scheme consider it advisable to conduct such a test twice a year, once in the hottest part of the summer and once in the depth of winter, until such time as the motor wagon is firmly established as the leading transportation agent in the middle western metropolis.

* * *

All Future Tests Will be Conducted by Men in the Industry.

The next demonstration can be made even more of an improvement on the first test than this latter was over any other power wagon contest that had previously been held. It would be premature at this time to divulge the plans of the men who have this matter under consideration, but it may be taken for granted that the promoters will be real power wagon men—not a mere "stunt squad" from outside the industry—and that the results, when written up, will form the completest analysis of local transportation that will have been published up to the time the affair takes place.

The publicity end of the demonstration will not be overlooked, and the record of the world's greatest motor wagon test, if it should be held, will of course be published in the way it would do the most good, not only to Chicago's merchants and power wagon factors, but to the world of transportation at large.

Funds for a motor ambulance are being raised by the Louisiana Society for the Prevention of Cruelty to Animals.

A motor chemical often covers an area of 14 square miles, according to Kenneth M. Blake of the Locomobile Company.

London taxidrivers should pay for their gasoline on a mileage basis, according to the president of the London Cabdrivers' Trade Union.

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Fleet of four G. V. electric wagons in the service of the Lincoln Safe Deposit Company, New York.

Electricity in Local Removals.

A Personal and Human Document of Timely Interest and Importance.

By WALTER C. REID.*
Gen. Mgr. of the Lincoln Safe Deposit Co., New York City.

MANHATTAN ISLAND is a long narrow island over 2 miles wide and about 13 miles long. When our company started in business 29 years ago, it sought to cater to the best class of trade which was then mainly located between Washington Square and 59th street, and Lexington and Sixth avenues, an area about 2½ square miles. Our warehouses are located less than a mile south of 59th street and the residential section extended a mile and a half further south. There were at that time very few apartment houses and it was an easy matter for a van to bring in four or five loads in a day. Our minimum price per van load south of 72d street was then and ever has been $5 per van load, exclusive of the labor in-and-out charge of $2 each way. So that a day's work of four van loads was fairly profitable.

* * *

Why This Concern Abandoned Horses.

Since the early eighties, the residential section has been extending further north, until now the island is fairly well covered and apartment house after apartment house has been built, with the result that we must make longer hauls from private residences and take twice as long a time when loading from apartment houses. There have been extensive increases in the warehouse service since those early days, and there are a number of more or less fireproof warehouses scattered pretty well over the island.

Our customers are moving north and away from us. To hold our trade we must meet the charges of other and nearby houses, at least as to cartage work.

This was being done in a measure at a loss, one van bringing in but two loads per day, doubling the cost of labor and the number of vans and horses required to do the original work. It can readily be seen that something had to be done to economize.

In addition to our furniture storage business we store large quantities of silverware and do a large business in the cold storage of furs and fabrics. For two months in the spring and two months in the fall the receipts and deliveries are very heavy. When horses were used on the cold storage service we used two double wagons and two single wagons and occasionally called on a warehouse van to help out. We fixed the limit to this service on the north at 125th street, about four miles. Packages beyond this were sent by express and there was more or less dissatisfaction and delay and goods were often roughly handled. Even with this service, deliveries of valuable packages often extended into the night and horses were worn out at the end of the season. We were therefore compelled to take up other motive power to meet the constantly growing demands for an improved service in this connection.

* * *

Bought Electrics Through Manufacturer's Confidence.

There were presented to our consideration vehicles propelled by gasoline and vehicles propelled by electricity. Gasoline motor wagons were given careful attention, but were finally set aside, first for the reason that the property hauled is often worth many thousand dollars, and the risk of loss by fire was deemed too great, and second, for the reason that the insurance rate on millions of dollars worth of goods stored would have been increased by bringing gasoline wagons into the warehouse for loading and unloading, and a separate garage would have been required for the machines when not in use. At that time also the wage of a good chauffeur for a gasoline car was $25 per week and he refused to do any work other than operate the car.

We were entirely ignorant as to makes of electric

*Abstract of a paper presented at a convention of the American Warehousemen's Association, December 6-8, 1911.

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cars but luckily had good advisers who recommended the machine we have since adopted, and we were particularly attracted to this manufacturer for the reason that he had so much confidence in the car that he was willing to give a guarantee covering a period of three years that the cost of maintenance including batteries, tires and all machinery would not exceed a sum that amounts to about $5 per day.

* * *

Electrics Show Splendid Work and Economy.

In the spring of 1909 we ordered a 1-ton electric delivery wagon of a capacity equal to one of our two horse delivery wagons. Two of our horse drivers were able to operate this in a very short time, one substituting for the other in emergencies, and the expense of maintenance and operation was very much less than expected. We have our own electric plant on the premises. This wagon did the work of two horse-wagons, finished the work at an earlier hour, and operated over a larger territory. In 1910, we purchased a duplicate of this wagon and two 3-ton furniture vans of a capacity equal to that of our horse vans (about 490 cubic feet). The two delivery wagons do the work formerly done by the four horse-wagons and finish earlier in the day. The vans can bring a load from the neighborhood of 125th street as quickly as the horse-vans could handle a load from 72d street, and we instructed our order clerk to use the electric vans on the long hauls during the rush, thus permitting the horse vans to handle only nearby work.

* * *

Maintenance Costs are Lower Than the Guarantee.

Another furniture van has been added this year (1911). We hope to add another next spring and to so continue until our entire van service is electrified. Our former horse drivers operate these cars. They take pride in them. They are paid $2 more per week than they were formerly receiving as drivers of horses. The cost of maintenance of these vehicles has been considerably below the guarantee. Previous to 1910 we had but one vehicle. But from January 1, 1910, to November 1, 1911, the entire expense of maintenance for the five vehicles has been but $3,336.65. Of this sum the cost for tires was but $302.02; the cost of batteries but $1,087.05. Of course doing little or no cartage other than to and from the warehouse the wear on tires and batteries is light. The mileage of the vans during the month of October, 1911 (October is a fairly busy month) was but 361, 323 and 366 respectively, showing that they traveled an average of but 14½, 12 and 14¾ miles per day respectively. This will give an idea of how much of the time each day is taken up in loading and unloading; the vans travel at the rate of eight miles per day. The delivery wagons during the same month made a mileage of 580 miles and 642 miles respectively, an average of about 23 and 25½ miles each. The cost for electric current for the month for five vehicles was $81.66. During the month of August when warehouse work is very light our entire mileage was but 1,075 miles and the cost of the current but $1.361.

Some Advice to Intending Purchasers.

I would like those who are interested to experiment with one vehicle before plunging in headlong, as many have done with gas cars. Be careful to select a good make; be satisfied with the design of the maker if it be anyway near what you want. Do not experiment with any untried batteries or other equipment no matter how seductive may be the announcements. If you will exercise the same caution of purchase as you would in purchasing a horse you ought to come very near to getting a machine that will be satisfying.

The first cost of motor vehicles as compared with a good team of horses and a horse van is so much greater that often those who would wish to experiment are deterred from doing so, but when it is considered that during the year there are in most places two busy seasons and two quiet seasons, that during the quiet seasons horses must be fed and cared for just the same, that electric vans while idle are costing nothing but the interest on the investment, and that it is unnecessary to have the expense of a stable separate from the warehouse on account of unpleasant odor and higher insurance rate, the electric van becomes more attractive. With horses eating their heads off there is always an incentive to take work at cost or less in order to keep teams employed, and customers will not understand why work at one time of the year should be more costly than at another. With the use of electric vans it is easier to decline work if the price is not attractive and a uniform rate of charge can therefore be more readily maintained.

A GOOD PRECEDENT.

In distinct contrast to those who would keep the motor wagon off the country roads and those who seek to hinder the progress and development of the machine by pernicious legislation, is the action of County Commissioner O. H. Rhoades, of Portland, Oregon, who has announced that his county court will replace with substantial steel structures the flimsy wooden culverts which now abound within the province of his authority.

Much transportation business to remote parts of the valley not touched by railways was done last year by motor trucks. Many strawberries were brought to shipping warehouses in this manner. The heavy trucks played havoc with the light culverts, which were not built for such strains.

FILES SUITS FOR WRECKED MACHINES.

The Mais Motor Truck has filed suits for $4.000 each against the Cincinnati, Hamilton & Dayton Motor Railroad Co. and the Terre Haute, Indianapolis & Eastern Traction Co., for the destruction of Mais motor wagons by cars of these respective railroads.

A 20-passenger motor bus has been put in service between Smithton and Belleville, Ill.

Frank Brandecker, of the Kissel Motor Car Company, is the president of the Wisconsin Commercial Car Association, recently organized at Milwaukee.

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Co-operative Fire Motors.

Suggestion by the Mayor of Elkhart, Ind., Contains a New Thought.

HELPING OUT a neighboring town by the loan of fire apparatus in cases of disastrous conflagrations is by no means a new idea, but the suggestion of Mayor Chester, of Elkhart, Indiana, for merging the fire departments of the neighboring cities of South Bend, Mishawaka, Elkhart and Goshen, all of Indiana state, in cases of extreme necessity, contains a noteworthy feature which is altogether novel. Mayor Chester proposes that the four cities be linked together by boulevards of macadam so that fast time can be made by the fire engines in case they are summoned from one city to another. He proposes that in order to make the plan possible, the assistance of the farmers will be necessary and that they will be expected to defray the expense of building the macadam roads.

* * *

Made Possible by Motors.

The introduction of motor fire apparatus into the fire departments of three of these cities gave rise to the probability of Mayor Chester's plan being adopted by the northern Indiana municipalities. Over a macadam roadway, it is figured that motor driven fire fighting machines could make the trip as follows:

	Miles.	Time.
South Bend to Goshen.....	25	37:30
South Bend to Elkhart.....	15	22:30
South Bend to Mishawaka.....	4	6:00
Mishawaka to Goshen.....	21	31:30
Mishawaka to Elkhart.....	11	16:30
Elkhart to Goshen.....	10	15:00

Osceola, which is located between Mishawaka and Elkhart, is also given consideration in the plan, but would not be expected to co-operate, because that place has only a volunteer department.

South Bend, Mishawaka and Elkhart already have installed motor fire engines and it is only a question of a short time before Goshen will follow suit. Chiefs of all fire departments interested are confident that the plan can be made a great success, and they will give their indorsement to the proposition when asked to make a recommendation by the Boards of Public Safety, which have jurisdiction over the matter.

There seems to be no reason why this admirable plan should not meet with success, and it is probable that other groups of cities situated in close proximity will follow the lead of these go-ahead Hoosier municipalities. Apart from the benefit to the public, the fire insurance companies will probably give their indorsement to the plan in the consideration of fire insurance rates.

Motor wagons handle 5 per cent of the freight from the docks of New Orleans.

GOOD IDEA FOR SHOWMEN.

James K. Hackett has a scheme which he thinks will eventually revolutionize one end of the show business.

Through the representative of a Detroit automobile factory, Mr. Hackett has placed an order for the largest motor wagon ever built. He plans to use the vehicle for the transporting of scenery between theaters and railway stations. The truck is so constructed, states the announcement, that it can be loaded upon a railroad flat-car, and carried from town to town without unloading.

The car being made for Mr. Hackett is said to be built on the van type. Instead of four wheels there will be eight, and the tires will be constructed of solid rubber.

Where the "jumps" between towns are short, as throughout New England, the truck might make the journey with its own motor power and thus save the railroad charges for transportation.

METZGER FAVORS SUMMER SHOW.

William E. Metzger, president of the National Association of Automobile Manufacturers, favors midsummer as the best time to hold automobile shows.

"The greatest sales of motor wagons to the consumer are just before the hot weather sets in, and just before the winter weather sets in," says Mr. Metzger, "consequently, midsummer will ultimately, in my estimation, be the logical date to hold a purely commercial automobile show. I believe that within a few years the makers of power wagons will unite on holding such a show at some central point, such as Detroit, where suitable buildings, test grounds, etc., can be had by utilizing the Michigan State Fair Association's property. My idea would be that this show should be run purely in the interests of the motor wagon manufacturers and those interested from a consumer's and agency standpoint in these vehicles. This would necessarily make the cost of such a show, to each exhibitor, very low. My idea further would be that suitable prizes, cups for instance, should be provided for tests of various kinds of the different classifications of machines. Daily endurance runs could be arranged, so that loaded vehicles could start from the exhibition grounds for a day's run, radiating from Detroit and returning each night and being checked in at the grounds."

It is somewhat of a coincidence that at a meeting of the Chicago Automobile Trade Association, held on April 22, it was decided to hold a summer show, for motor wagons only, in Grant Park, Chicago, during the last week in August.

SELF-STARTER FOR FIRE MOTORS.

The fire department motors in Grand Rapids will be equipped with self-starters if Fire Marshal Lemoin's recommendation on this point is approved.

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Patent Monopolies.

Dick Mimeograph Decision Has Caused Much Unnecessary Alarm.

THE INVENTOR of a patented internal-combustion engine may sell his machine under the stipulation that a particular brand of liquid fuel must be used with it, or that it should or should not be employed for motor wagon operation, or that it may be run only by a one-legged man or a Barbary ape, or just as the patentee may happen to dictate the terms of sale and use.

This is, in effect, the interpretation of the patent law of this country, as handed down in a recent decision—later confirmed—by a majority opinion of the Supreme Court of the United States, in the famous Dick mimeograph case.

Judged in its broadest aspect, the ruling in this case finally establishes the fact that a United States patent is just exactly what it was intended to be—a monopoly of the most absolute kind for 14 years.

There is nothing untoward or unfair in this interpretation of the law, although many have construed it as restricting the sale and use of articles to which the patent does not specifically or even indirectly apply. If the patentee does not manufacture and sell his patented article, as he has a perfect right to do, the market is not disturbed, for things are as they were before the patent was allowed. If he does make and sell the article, the restrictions he imposes as to its use and application affect only that article and do not apply to anything else, so again the market is not disturbed, except perhaps indirectly in very special cases.

It goes without saying that if any one does not approve of the patentee's restrictions, he is not compelled to buy the article. On the other hand, if the restrictions are prohibitive, the sale of the article is decreased accordingly, and the patentee is the sufferer. Therefore it follows that the matter will regulate itself, and that prohibitive restrictions will not be imposed if sales of the patented article are required. If sales are not required, the article will not be manufactured, and nobody will say that a patentee may be compelled to manufacture against his will.

Thus the justice of the Supreme Court decision is logically demonstrated.

But this is very different from saying that our Patent Law is ideal. It is not. It will be, perhaps, when the granting of a patent places upon the government the onus of prosecuting infringements, instead of, as now, merely giving the patentee the right to sue.

AN INTERESTING DEVELOPMENT.

A revolutionary transportation idea is to be tried out by the San Jose Terminal Railroad company, now building an electric line between San Jose and deep water north of Alviso to connect with a line of fast steamers running out of San Francisco.

It is announced that power wagons will be used to gather freight in San Francisco and that these machines will be run on the decks of barges without unloading and carried to the San Jose terminal company's wharf. From that point the loaded motor wagons will be transferred to flatcars and transported to San Jose. Under their own power the machines will then distribute the freight to all parts of the Santa Clara valley.

Statisticians of the company figure that they can save $2 a ton to the shippers.

WILLYS ACQUIRES CONTROL OF GRAMM CO.

John N. Willys of Toledo, Ohio, president and sole owner of the Willys-Overland plants and allied interests, has bought the controlling interest in the Gramm Motor Truck Company of Lima, Ohio. This is one of the most important automobile deals of the year, and came as a great surprise to the entire industry. The purchase price was not given out, but it is said to have been one of the largest transactions in the recent history of the automobile business.

For some time J. N. Willys has been casting around for a power wagon plant that was equipped to meet the requirements and demands of the commercial motor users of America, and particularly of the more than 2,000 Overland dealers. Realizing the enormous development in the motor wagon field, and of the impracticability of combining the pleasure and commercial ends of the business, he had determined on a method of motor truck production that would parallel that of his well known pleasure cars. After a careful study of the power wagon field he found that the Gramm staff and plant of Lima, Ohio, measured up to his ideal of what a motor wagon factory should be.

The combination is ideal. J. N. Willys—the greatest individual car manufacturer in the world, and B. A. Gramm—one of the most experienced truck manufacturers in the industry. The combined brains, capital, experience and ability of these two producers will, unquestionably, show some remarkable and rapid advancement in the power wagon business. They will have an immediate outlet for their entire output through the Overland dealers, which number over 2,000, and the present successful Gramm dealers.

The Gramm motor wagon plant is the largest in the world devoted to the exclusive manufacture of nothing but commercial motors. The factories are located on 22 acres of ground. There are 6¼ acres under roof. Twelve hundred men are employed. All of the equipment is of the very latest and the best that can be had. The automatic machinery is the most modern. The buildings are of steel and reinforced concrete, and are valued at $1,250,000.

Pennsylvania's borough and township motor fire apparatus will get state license tags free.

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Alabama.

Birmingham has adopted an ordinance providing for the payment for the six motor hose wagons recently delivered to the city. The city agrees to pay $8,600 in cash and to execute five notes of $4,000 each, bearing interest at 5 per cent and payable semi-annually.

Kissimmee has purchased a motor hose and chemical.

* * *

Arkansas.

Little Rock has installed a motor aerial ladder truck.

* * *

California.

Fresno has accepted a motor chemical on a 90 days' demonstration.

Hillsboro will spend $15,000 on the fire department. Some motor apparatus will be purchased.

Los Angeles has advertised specifications for a 2-ton motor truck for the fire alarm department.

National City has an 80-hp. motor hose and chemical.

Oakland has received two motor fire trucks.

San Francisco will need to expend $1,000,000 in converting its fire department to an all-motor basis. A motor chemical was recently installed.

Visalia will install a motor fire truck.

* * *

Colorado.

Leadville has ordered a motor fire truck to be paid for on the installment plan.

Trinidad will install a $6,000 motor hose and chemical wagon.

* * *

Connecticut.

Bridgeport is placing self-starters on its motor fire apparatus.

Hartford has ordered three motor hose and chemical wagons and two officers' cars, to cost $15,900 in all.

New Canaan has been presented with a motor hose and chemical by A. H. Mulliken of that city and Chicago.

New Haven has installed a motor pumping engine.

Norwich has a motor hose and chemical.

* * *

Delaware.

Wilmington has ordered a 70-hp. motor fire truck, to cost $5,500.

* * *

Georgia.

Athens will install a motor fire truck.

Dawson has ordered a $6,000 motor hose and chemical.

Macon has installed two motor fire engines and one motor fire truck at a cost of $21,000.

Waycross has installed a motor hose and chemical.

* * *

Illinois.

Elgin is investigating motor fire apparatus with a view to buying later.

Moline has ordered a motor hose wagon.

* * *

Indiana.

Bluffton has installed a $4,000 motor fire truck.

Evansville has a motor fire truck.

Fort Wayne has installed a $3,950 motor chemical.

Indianapolis has installed a motor hook and ladder truck. A $5,000 motor hose and chemical wagon and a $3,000 emergency automobile are on order.

Marion has installed a motor fire truck.

Richmond has bought a $5,500 motor hose and chemical.

South Bend has a new motor chemical. A fire chief's automobile has been ordered.

* * *

Iowa.

Burlington has asked for bids on a combination motor fire engine, aerial truck and chemical, to travel 35 miles an hour on the level.

Des Moines has appropriated $11,000 for two motor fire trucks.

Dubuque has advertised for bids on a combination motor pumping engine and hose wagon.

Marshalltown has a motor hose and chemical.

Sioux City has installed a motor fire engine.

Waterloo's fire truck has a motor-operated siren.

* * *

Kansas.

Atchison has appropriated $7,000 to pay for one-half the contract price on its two pieces of motor fire apparatus. The rest will be paid later.

Hutchinson has bought a motor fire engine and a motor chemical.

Topeka has received a motor wagon for the use of the fire chief.

* * *

Kentucky.

Covington has installed a motor chemical.

Louisville has voted to purchase another motor fire truck.

* * *

Maryland.

Annapolis has a motor fire engine, costing $8,000, raised partly by public subscriptions and public festivals.

Catonsville has a motor engine and chemical, capable of doing 65 miles an hour.

* * *

Massachusetts.

Andover is in line for a motor chemical.

Arlington has voted $8,000 for a motor fire engine. The city has only 13,000 inhabitants.

Boston has a motor ladder truck. A water tower and a motor combination chemical engine are on order.

Everett has installed a motor chemical.

Haverhill is considering the purchase of a motor fire engine.

Holyoke is planning to equip its motor fire apparatus with self-starters.

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Ipswich has a motor hose and chemical.

Lynn has installed a motor pumping engine, costing $8,000.

Nahant expects to install shortly a motor fire engine.

Nantucket has ordered a motor chemical. Hitherto this city has excluded automobiles from its streets.

New Bedford has appropriated $4,664 for a motor wagon chassis for its fire department.

Salem has a motor chemical.

Springfield has received the chassis for a new electric combination hose wagon.

Stoneham has voted $5,900 for a motor fire truck.

Wakefield has ordered a $5,500 motor fire truck.

* * *

Michigan.

Detroit has installed a motor tractor of the four-wheeled long-base type, for pulling a water tower. The city has also three motor pumping engines, one motor chemical and two flying squadrons. Three more motor fire engines were ordered recently, and the whole department will shortly be motorized.

Grand Rapids has purchased a front-drive motor tractor.

Muskegon has advertised bids for a fire and general-utility automoible.

* * *

Minnesota.

Duluth has bought a $2,500 automobile for its fire chief.

Minneapolis has bought three motor hose and chemical wagons at a cost of $15,780. A chassis has also been acquired for $2,100, and is being fitted out by the city as a chemical engine at a cost of $800 for equipment. The city will expend $20,000 to build a new fire house for the motor equipment.

St. Paul is considering the purchase of a motor fire engine.

Waconia will purchase a motor fire truck.

* * *

Mississippi.

Jackson has purchased a $5,150 motor hose and chemical.

Vicksburg has installed a $4,800 motor hose wagon.

* * *

Nebraska.

Benson will buy a motor fire truck.

Fremont has a motor fire wagon.

Lincoln has installed a $7,500 motor combination pumping engine and hose truck. It recently went through snowdrifts up to 3 feet in depth at a speed of 12 to 15 miles an hour.

Omaha has installed a motor hose and chemical. Self-starters have been fitted to the motor fire apparatus in this city.

* * *

New Hampshire.

Nashua has appropriated $6,000 for a motor fire truck.

Portsmouth has installed a $5,000 motor chemical.

* * *

New Jersey.

Camden has bought two motor combination chemical trucks for $9,000.

Hoboken has invested $2,090 in a fire chief's automobile.

Montclair has ordered a triple combination motor fire truck which will displace six horses, also a motor ladder truck, the two of them costing $13,500.

Morristown has a $5,650 motor ladder truck.

Newark has installed an $8,500 motor fire engine. More motor fire apparatus will be ordered.

Paterson is steadily converting its horse-drawn fire apparatus into motor trucks.

Princeton will receive its motor fire engine on or about June 17.

Ventnor has installed a $9,000 motor fire engine.

* * *

New York.

Albany has installed a motor fire truck.

Binghamton has a motor ladder truck.

Buffalo has purchased a motor fire engine, costing $8,500.

Elmira has decided to purchase a motor fire truck.

New Rochelle has ordered a motor hose and chemical.

New York expects to motorize its fire department within five years.

Olean has installed a motor fire truck.

Matteawan has purchased a motor hose and chemical.

Sleepy Hollow has ordered a motor fire truck.

Watertown has ordered a motor hose and chemical.

West New Brighton has a new motor fire truck.

* * *

North Carolina.

Charlotte has installed a motor fire truck. It cost $5,000.

* * *

Ohio.

Cleveland will install a motor chemical and a motor pumping engine.

Lorain has formally accepted two motor fire trucks, which cost $14,125.

Massillon has appropriated $4,000 for the purchase of a motor fire truck.

Toledo has bought a $1,300 automobile for its fire chief.

* * *

Oklahoma.

Muskogee has installed another motor fire truck.

* * *

Pennsylvania.

Connellsville has ordered a $5,750 motor fire truck.

Kittanning has installed a motor fire truck and is now arranging benefit performances to pay for it.

Homestead will install a 70-hp. motor fire truck, costing $5,000.

Shenandoah has a motor chemical.

Sunbury has ordered a $2,500 motor hose truck. It is being built by a local concern.

Washington has installed a motor hose and chemical.

* * *

South Carolina.

Anderson has installed a motor fire truck, costing $5,500.

Charleston has ordered a tractor.

Greenwood has bought a combination motor hose and chemical which will be used as a tractor to draw a steam fire engine.

Orangeburg has on order a motor hose and chemical, costing $5,500.

* * *

Tennessee.

Nashville has called off all bids for motor apparatus and has accepted a machine for a three months' free service test.

* * *

Texas.

Cuero has bought two 20-hp. automobiles on which hose reels have been mounted by the fire department.

Grand Saline, a city of 2,500 inhabitants, has purchased a motor fire truck.

Georgetown has bought a motor fire truck.

Houston has installed a combination motor pumping and hose wagon, and will shortly have delivered a motor aerial truck and a motor service (ladder) truck. The amount involved is $20,500.

Lockhart is considering the purchase of a $5,500 motor hose and chemical.

Vernon has bought a $5,500 motor hose and chemical.

* * *

Utah.

Salt Lake City has installed a $5,550 motor hose and chemical and a $4,500 fire chief's automobile.

* * *

Virginia.

Staunton has installed a motor fire engine.

Richmond has ordered a combination motor fire engine and three standard fire chief motor cars.

* * *

Washington.

Spokane's motor fire engine has been equipped with a self-starter.

Tacoma has eight pieces of motor fire apparatus in service and shortly will be in the market for more.

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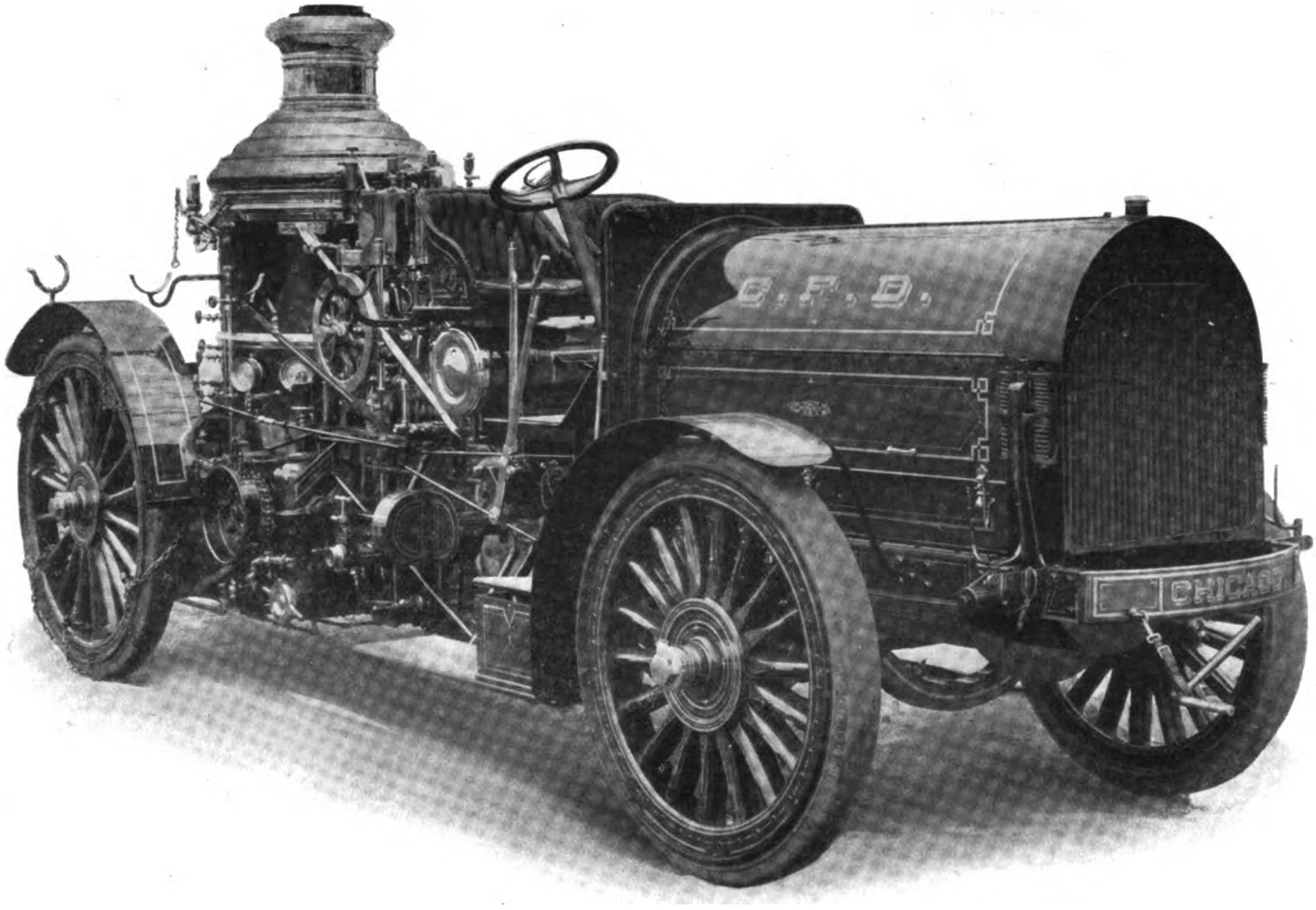
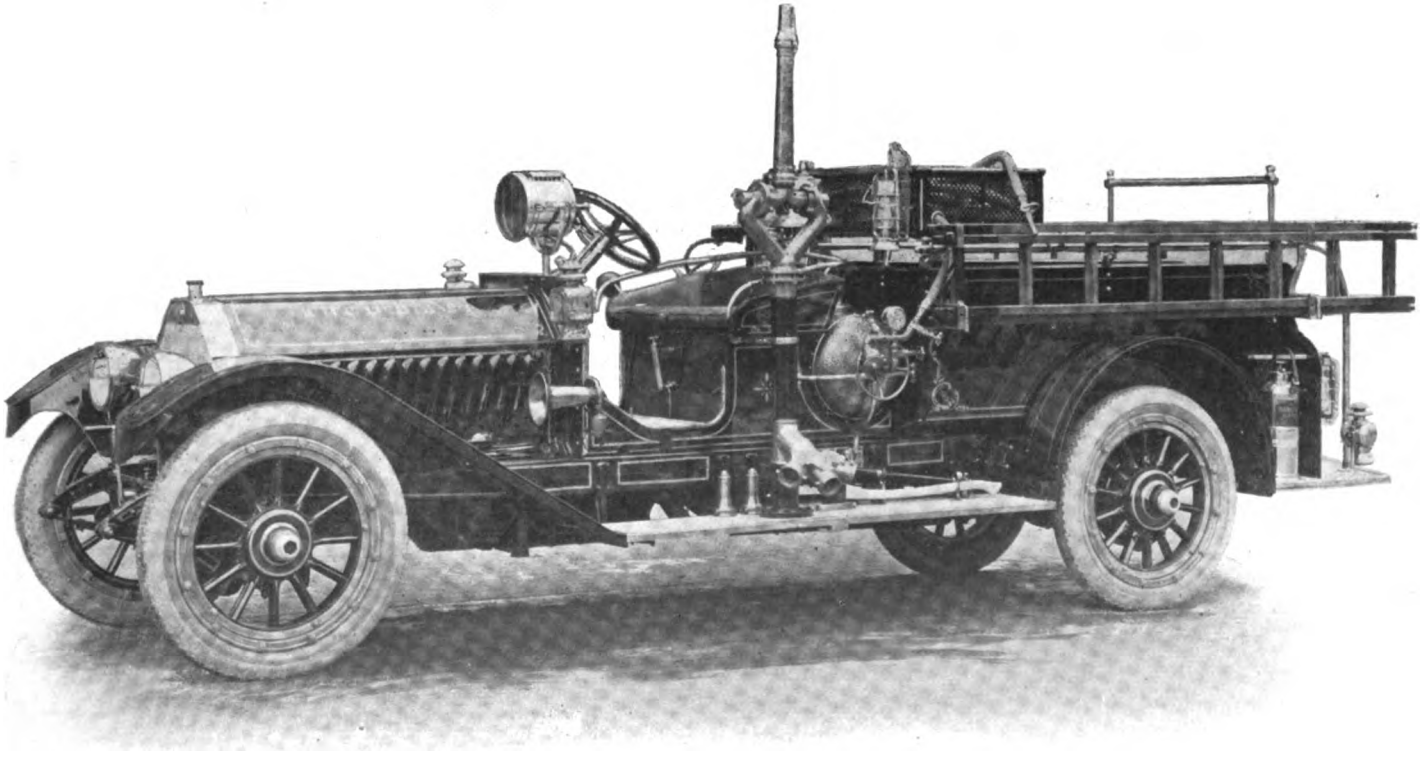


The only type of motor-propelled steam fire engine. This machine is one of three ordered by Chicago. New York City has one, Paterson (N. J.) has two, and Bridgeport (Conn.) and Birmingham (Ala.) one each. They were all made by the Nott Fire Engine Company, Minneapolis, Minn.



The larger of two Oldsmobile fire engines in the service of Lansing, Mich., fire department.

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West Virginia.

Wheeling has installed a motor hose and chemical.

* * *

Wisconsin.

Appleton is considering the purchase of motor fire apparatus.

Beloit has a motor fire truck.

Janesville has a fire motor.

Milwaukee is furnishing each fire engine house with a motorcycle or two, equipped with chemical apparatus to be used in extinguishing small fires.

Racine has installed a combination motor hose wagon.

OPERATING COST OF FIRE MOTORS.

We have received from Chief McFall, of the Roanoke (Va.) fire department, the following official report of the cost of operating his motor fire apparatus during the five months ending March 1 last:

Company No. 4—Miles, 197.3; gallons gasoline, 167; quarts lubricating oil, 30.

Company No. 5—Miles, 147.8; gallons gasoline, 130½; quarts lubricating oil, 20.

Company No. 6—Miles, 87; gallons gasoline, 77½; quarts lubricating oil, 13.

No. 4 company made one mile on 8.10 gallons gasoline.

No. 4 company made 6½ miles on one quart of lubricating oil.

No. 5 company made one mile on 9.10 gallons of gasoline.

No. 5 company made 7½ miles on one quart of lubricating oil.

No. 6 company made 1 mile on 9.10 gallons gasoline.

No. 6 company made 7 miles on 1 quart of lubricating oil.

No. 4 company—167 gallons gasoline at 12 cents, $20.04; 30 quarts lubricating oil, 11 cents, $3.30; total, $23.34.

No. 5 company—130½ gallons gasoline, 12 cents, $15.66; 20 quarts lubricating oil, 11 cents, $2.20; total, $17.86.

No. 6 company—77½ gallons gasoline, 12 cents, $9.30; 13 quarts lubricating oil, 11 cents, $1.43; total, $10.73.

Gasoline and oil for five months, $51.93; minor repairs for five months, $34.40; total cost of three machines for five months, $86.33.

These machines take the place of six horses which would have cost $15 per horse per month, based upon the actual cost of the horse-drawn engines, or a total for five months of $450.

This represents a saving of $363.67.

$25,000 FOR FIRE APPARATUS.

On April 8 last the city of Dayton, Ohio, authorized a bond issue of $25,000 for the purchase of three motor fire trucks, one motor patrol wagon, three motorcycles for the police department and a quantity of fire hose.

MOTOR BUSES FOR MONTREAL.

At a recent meeting of the City Council of Montreal, Canada, an application was received from the Canadian Autobus Company offering to establish a complete motor bus service in Montreal, which it is claimed would supplement the present street car service.

The company offers to establish such a service as the city authorities desire and will charge straight five cent fares with transfer privileges.

The letter from the company was referred to the Legislation Committee for report, and before the council adjourned Ald. L. A. Lapointe gave notice of a by-law which would under certain restrictions permit the company to run its motor buses on Montreal streets.

The communication from the company, which is signed by W. D. Strachan, president, begins by saying that it has obtained a Dominion charter for the purpose of establishing a motor bus service in different cities of Canada, as has been done in London and Berlin. It is further remarked that such lines of communication are required as supplementary to tramways, which cannot handle all traffic, by branching off into every street. Thus a public demand is created for the buses. As to fares they cannot be made so low as those obtained generally on street cars, though this has not prevented the success of the undertaking in other cities, for the reason that the cars can be operated without poles or wires, and without rails, which interfere so much with street pavements.

The promoters of the company proceed with the statement they desire to obtain from the city of Montreal permission to establish and operate within a few weeks a complete motor bus service, with motor vehicles of the proper size. They further state they will be in a position to transport 100,000 passengers a day and to open up new circuits when needed. The streets are to be such as the city and the company may be able to agree upon, and the company will provide the buses running from the outer parts of Montreal to the business centers, and vice versa. The company further agrees to establish a five minute service, which might be reduced to three minutes in rush hours. The buses would be run from 8 a. m. to 12 midnight at five cents per passenger with transfer rights, entitling the user to continue his journey; the company also agrees to supply a seat for each passenger. An exclusive franchise for a period of ten years is requested.

Rochester has a specially designed mail motor wagon.

Hahnemann Hospital, Rochester, N. Y., has a motor ambulance.

Four new mail motors go into service in Indianapolis on May 1 next.

Fifty English-made motor buses will be put in service in Toronto, Canada.

Two additional motor garbage trucks have been acquired by Atlanta, Ga.

Davidson County Asylum, Nashville, Tenn., has installed a motor ambulance.

Los Angeles is endeavoring to raise money for a municipal garage and repair shop.

Motor wagons in Salem, Ore., must carry two license tags, one in the front and one in the rear.

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THIS WON'T LAST LONG.

Two instances of motor wagons being literally ordered off the road have come to notice recently. We quote from local newspapers:

* * *

"Two motor trucks belonging to a furniture supply house of Dayton were sent down yesterday on a flatcar because Sheriff Denny Lawrence would not permit them to cut up Clark county roads.

"The trucks were located Thursday night west of the city and returned. The chauffeurs were allowed their freedom on promise not to attempt the run to Dayton."—Springfield (Ohio) "Sun," March 29.

* * *

"That the heavy motor trucks will not be permitted to ruin the shell roads of Jefferson county which were built at such heavy cost and designed for the use and benefit of all the people was asserted by County Judge Wilson yesterday.

"Judge Wilson states that there has been much complaint on the score of the motor trucks going over the shell roads, loaded with tons of freight and causing great damage and injury to the roads. The matter was discussed at the last meeting of the county commissioners' court and referred to the county judge for action.

"Judge Wilson says that he wrote to the T. S. Reed Grocery Company and to the Stedman Fruit Company, calling their attention to the grievance of the citizens and asking them to desist from damaging the road. Judge Wilson states that he did not receive a reply to his letter from either concern, but that yesterday he conferred with them and both concerns promised to desist from hauling heavy freights or damaging the county road. Judge Wilson also took up the matter with the Texas Storage Company, which also owns a big motor truck. While no definite understanding was reached, negotiations are in progress with this concern, which Judge Wilson believes will result in a satisfactory agreement.

"Judge Wilson says that he prefers to adjust these matters in an amicable way, but that if necessary, proper remedial action will be taken, probably in the nature of a suit for injunction."—Beaumont (Tex.) "Enterprise," March 29.

SIOUX CITY CONTRACTOR USES MACHINES.

Far from merely "considering" the use of machines, contractors are adopting them all over the country. The Bennett Auto Supply Company, of Sioux City, Ia., is using two power wagons, one of 4 tons and the other of 7 tons capacity, on the Morning Side paving job which calls for $20,000 worth of hauling alone. The big machine is a dump truck with a power winch attachment which can be used for hoisting the body of the truck, or pulling loaded freight cars, or the like.

According to a recent consular report, Austria is a good market for American motor wagons.

GOOD PUBLICITY WORK.

A meritorious and useful piece of publicity work has recently been undertaken by the B. F. Goodrich Company for the benefit of motor wagon users. This is in the form of power wagon expense statements, comprising a large portfolio of 12 pages, one for each month of the year, and small cards for daily reports by the drivers. These records are shown in the accompanying illustrations (much reduced). The data from the small cards are intended to be copied by a recording clerk into the monthly statement. That these record blanks are meeting with favor is evidenced by the fact that the third edition of 1,000 monthly records and 100,000 daily cards is nearly exhausted. Copies may be had from the B. F. Goodrich Company, Akron, Ohio.

This card was compiled and furnished for the benefit of truck owners by
THE B. F. GOODRICH COMPANY, Akron, Ohio

Car No._____ Cap._____ On_____ 1912

Driver_____ At_____

Tires

22074

RF	LF	RR	LR
Make, Size, Type, Repairs, Cost	Make, Size, Type, Repairs, Cost	Make, Size, Type, Repairs, Cost	Make, Size, Type, Repairs, Cost

Weather_____ Temp._____

Road_____

Left and Arrived	Time	Miles	Load. Lbs.	Un-Ld. Lbs.
L				
A				
L				
A				
L				
A				
L				
A				
L				
A				
L				
A				
L				
A				
Total				

Current or Gasoline Used_____ Oil Used_____

Miles per Gal._____ Miles per Hour_____

Write Remarks on Other Side

Motor wagon daily report card.

This Motor Truck Expense Statement was Compiled and Furnished for the Benefit of Truck Owners by THE B. F. GOODRICH CO., Akron, Ohio

No. of Truck_____ Capacity_____ Month_____

Num.	DRIVER	Wages Driver	Wages Helper	Garage Cost	Gasoline or Current		OIL		GREASE		Repairs to Mach'y and Cost		Repairs to Body and Gears		BATTERIES	MOTOR	R. F. TIRES	L. F. TIRES	R. R. TIRES	L. R. TIRES	MILEAGE		Tons Carried
					Quantity	Cost	Quan't	Cost	Quan't	Cost	Routine	Accident	Routine	Accident	Repair or Replacement	Repair or Replacement	Make Size Type Repairs Cost	Make Size Type Repairs Cost	Make Size Type Repairs Cost	Make Size Type Repairs Cost	Total	With Load	
1																							
2																							
3																							
4																							
5																							
6																							

Motor wagon monthly expense statement.

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Motor Patrol Notes.

Police, Insurance and Fire Patrols an Important Branch of the Industry.

Birmingham, Ala., has a new motor police patrol.

* * *

Little Rock, Ark., has installed a motor police patrol wagon. The horse drawn patrol it displaced traveled 6,234 miles during 1911. The cost of maintaining the horses during this period amounted to $828.92, which is almost 50 per cent of the cost of the machine.

* * *

San Francisco, Cal.—Members of the North Stockton Street Improvement Association are discussing the advisability of calling the attention of the municipal authorities to the reckless speeding of the Underwriter's fire patrol over the streets in the northern section of the city. The Fire Underwriters' Association maintains a motor patrol wagon on Pacific street, near Larkin, and in answering alarms in the North Beach section, it is asserted by residents of the district, the chauffeur indulges in foolhardy stunts with the apparatus. The machine is equipped with an ear-piercing siren which also tends to the annoyance of householders. Business men in the district are daily looking for a horrible accident, and for that reason believe that the Underwriters' apparatus should receive the attention of the authorities.

* * *

Pueblo, Col.—A motor police patrol has been purchased for $2,050.95.

* * *

Wilmington, Del.—The motor police patrol traveled 372 miles in March last, and 218 miles in February. In March 221 calls were answered, and 339 people carried, both being above the average.

* * *

Augusta, Ga.—A 50-hp., 10-passenger, motor police patrol, with a speed capacity of 75 miles an hour, has been installed in this city.

* * *

Savannah, Ga.—Exceptional police activity on Saturday night, March 30 last, caused the police automobile to be requisitioned as a patrol wagon, as the patrol wagon horses were all played out after a hard day's work.

* * *

Elkhart, Ind.—A motor police patrol will be installed on May 1.

* * *

Gary, Ind.—Between November, 1909, and April 14, 1912, Gary's 12-passenger motor police patrol traveled 12,500 miles. It has been operated at an inclusive cost of $1,975, or about 15 cents a mile. The machine, besides hauling many thousands of prisoners, has often been used on expeditions for the relief of the poor, and during the blizzards of last winter did valiant service in carrying school children through the snow drifts to their homes.

* * *

Indianapolis, Ind.—Another 6-clyinder, 7-passenger motor car has been purchased for use as a police patrol.

* * *

La Fayette, Ind., has installed a combination motor patrol and ambulance, at a cost of $3,000. It has a guaranteed speed of 45 miles an hour.

* * *

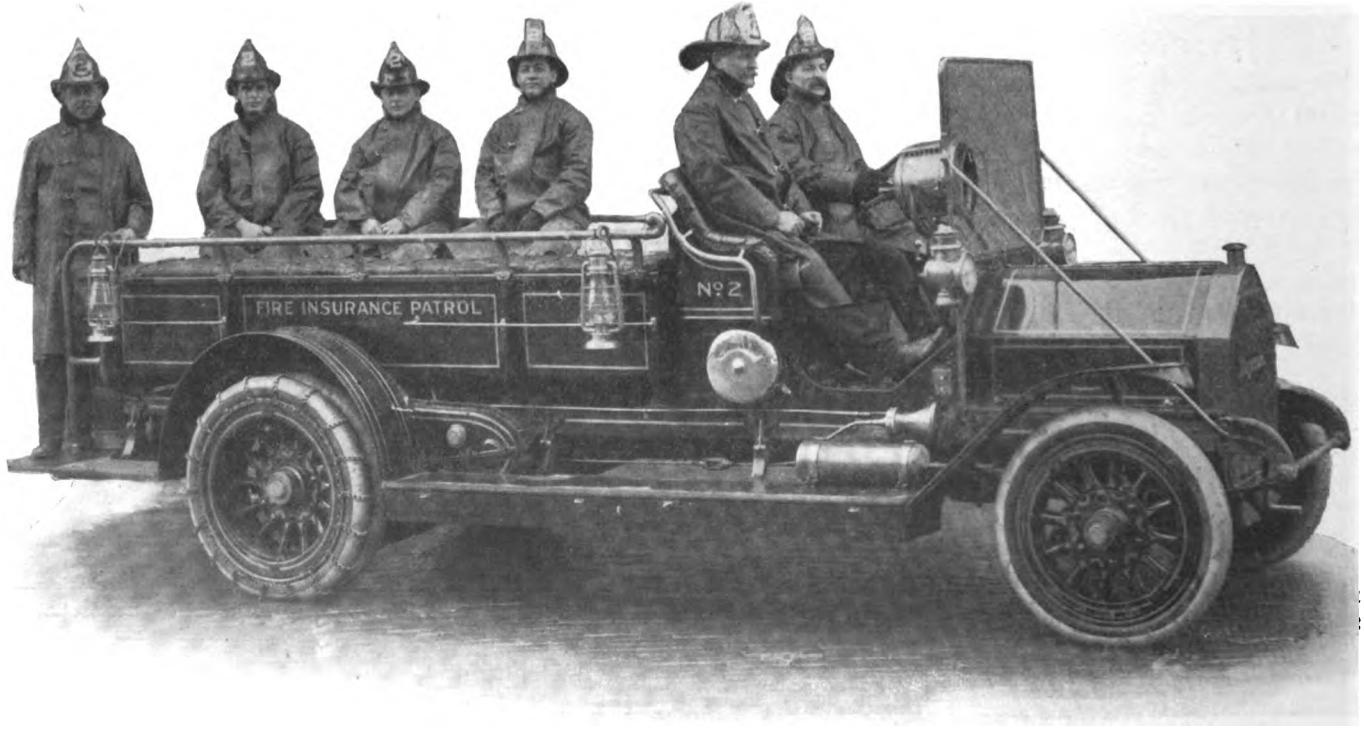
Michigan City, Ind., has ordered a 45-hp. combination patrol and ambulance, to cost $3,300.

* * *

Davenport, Ia.—The motor police patrol had a busy day on March 8 last, making no less than 15 trips. "It seemed," says the Davenport "Times," "that nearly every officer in the city had apprehended some wayfarer who had strayed from the straight and narrow path that leads to perdition and to the police station." [No, it's the other path, and our contemporary evidently meant the "strait" gate and the narrow way.—Ed.]

* * *

Lexington, Ky., is getting impatient for the delivery of its new motor police patrol, ordered recently. Delivery is expected in July.



Stegeman fire insurance patrol supplied to Milwaukee, Wis.

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Courtesy of the Indianapolis "News."

The three U. S. army motor wagons which recently completed a 1509-mile cross-country test.

New Orleans, La., has a new motor fire patrol, recently purchased by the Fire Insurance Patrol, of which G. S. Hauser is president.

* * *

Brockton, Mass., has installed a 17-passenger motor police patrol, which cost $3,500. The horse which pulled the old-time wagon has been sold.

* * *

Kalamazoo, Mich., will install a motor ambulance and patrol service, a bond issue for this having been approved by the voters. A 5-passenger emergency automobile also has been presented to the police department by the Michigan Buggy Company, upon payment of the nominal sum of $1.00.

* * *

Lincoln, Neb., has installed a motor police patrol which cost $3,100.

* * *

Concord, N. H., has appropriated $4,000 for the purchase of a combination motor ambulance and police patrol wagon and for the construction of a garage for it.

* * *

Hoboken, N. J., has bought a motor police patrol for $2,000.

* * *

Jersey City, N. J., has a new motor police patrol, costing $2,000.

* * *

New York City, through Police Commissioner Waldo, has ordered three motor police patrols, the first of the motor apparatus intended to displace entirely all the horses now used for pulling patrol wagons.

* * *

Asheville, N. C., has installed a motor police patrol wagon, built on a regular motor truck chassis.

* * *

Portsmouth, Ohio, will shortly purchase a motor police patrol, if the recommendation of Chief Phillips is approved. A machine costing $3,000 is being investigated.

* * *

Erie, Pa., will install a motor police patrol.

* * *

Philadelphia, Pa., will shortly appropriate funds for the purchase of motor fire patrol wagons.

* * *

Richmond, Va., has a motor police patrol which has been criticized for being operated at excessive speeds and without rear lights. A mandate has been issued by the Board of Police Commissioners that these abuses be rectified.

Milwaukee, Wis., has installed its second motor insurance patrol. It was built by a local motor wagon maker and is capable of 60 miles an hour. An illustration is shown herewith.

* * *

Cheyenne, Wyo., last stronghold of the horse in the West, has succumbed to the new idea. A motor police patrol was installed here on April 1 last.

MOTOR ASH CART.

One of the simplest and, in this case, most effective of "machine" appliances for loading motor wagons, is that used on an Autocar which is employed by the Massachusetts Institute of Technology for removing ashes. The ashes are loaded by means of a hand-controlled metal can which is hoisted by a crane equipped with a block and fall, as shown in the picture. The motor wagon is fitted with a removable inner metal body, which can be dumped by elevating the forward end by means of a chain belt operated by hand crank wheels. This device has been in successful operation for two years.

Autocar ash wagon with can hoist, used by the Massachusetts Institute of Technology.

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Dealers Recently Appointed.

Town and State.	Agent.	Make of Truck.
Phoenix, Ariz.	New State Auto Aerial Co.	Federal
Bakersfield, Cal.	McKee & Scott.	McIntyre
Fresno, Cal.	McKee & Scott.	McIntyre
Los Angeles, Cal.	Standard Motor Car Co.	Federal
Los Angeles, Cal.	U. S. Motor Car Co.	United States
San Francisco, Cal.	Auto Sales Co.	Alco
San Francisco, Cal.	A. E. Hunter Auto Co.	Garford
San Francisco, Cal.	Pacific Motor Car Co.	Herreshoff
San Francisco, Cal.	Standard Motor Car Co.	Federal
San Francisco, Cal.	Thompson Bros.	Johnson
Toronto, Can.	A. Crow	Alco
Toronto, Can.	Stevens-Pearce Co.	Velie
Vancouver, B. C.	Tucker & Campbell	Federal
Walkerville, Ont.	New Dominion Motors Co.	Federal
Windsor, Ont.	Windsor Mfg. Co.	Lincoln
Winnipeg, Man.	Dariven Motor Truck Co.	Commer
Winnipeg, Man.	Western Can. Motor Truck Co.	G. M. C.
Denver, Colo.	W. W. Barnett.	Federal
Denver, Colo.	Colburn Automobile Co.	Little Giant
Denver, Colo.	McDuffee Motor Co.	Wichita Falls
Bridgeport, Conn.	J. L. Carpenter.	Federal
Bridgeport, Conn.	Edwin W. Jennings Co.	Lippard-Stewart
Danbury, Conn.	Tillow Auto Co.	Federal
Hartford, Conn.	R. D. & C. O. Britton Co.	Federal
Hartford, Conn.	McIntyre Commer. Car Co.	McIntyre
New Haven, Conn.	Biever Motor Car Co.	Lippard-Stewart
Stamford, Conn.	Mechalen Auto Co.	McIntyre
Washington, D. C.	Motor Truck Corporation.	Alco
Washington, D. C.	Motor Car Co.	Dart
Jacksonville, Fla.	Guy R. Champlain.	Alco
Jacksonville, Fla.	F. E. Gilbert.	Velie
Jacksonville, Fla.	Claude Nolon	Federal
Atlanta, Ga.	Adams-Price Automobile Co.	Grabowsky
Chicago, Ill.	James Egan	Blair
Chicago, Ill.	R. W. Howe & Co.	U. S.
Chicago, Ill.	R. S. Mattoon Motor Car Co.	Indiana
Chicago, Ill.	Charles M. Hayes.	Stegeman
Chicago, Ill.	C. E. Swanson.	McIntyre
Chicago, Ill.	The Lansden Co.	Lansden
Decatur, Ill.	Augustus E. Staley.	Alco
Joliet, Ill.	Moore & Kickels.	E-M-F
Oakwood, Ill.	G. H. Malton.	Handy Wagon
Peoria, Ill.	Banta Bros.	McIntyre
Urbana, Ill.	Urbana Auto Co.	Monitor
Connersville, Ind.	Geo. R. Beeson	McIntyre
Fort Wayne, Ind.	M. N. Plumadore.	Federal
Hartford City, Ind.	Hartford City Auto Co.	McIntyre
Huntington, Ind.	Shrinkle, Richardson & Co.	McIntyre
Indianapolis, Ind.	Morris Motor Sales Co.	Chase
South Bend, Ind.	Milton G. Smith Auto Co.	Adams
South Bend, Ind.	Milton G. Smith Auto Co.	Gramm
South Whitley, Ind.	Owen M. Smith.	McIntyre
Terre Haute, Ind.	Terre Haute Auto. Co.	Lippard-Stewart
Tipton, Ind.	Ed-Le Auto Co.	Auglaize
Cedar Rapids Ia.	Barton-Ford Motor Co.	Velie
Council Bluffs, Ia.	Bradley, Merriam & Smith.	McIntyre
Davenport, Ia.	Witt & Lembrecht.	Grabowsky
Des Moines, Ia.	Capital City Carriage Co.	Commer
Redfield, Ia.	Nelson Bros.	Dart
Shreveport, Ia.	Shreveport Garage	Velie
Larned, Kans.	W. S. Young.	Federal
Covington, Ky.	Kentucky Motor Car Co.	Indiana
New Orleans, La.	The Commer Truck&Auto Co	BowlingGreen
New Orleans, La.	The Commer Truck & Auto Co.	Gramm
Baltimore, Md.	Everitt Auto Co.	Board
Baltimore, Md.	Neely & Enson.	Lippard-Stewart
Baltimore, Md.	Norwood Bros.	Lincoln
Baltimore, Md.	Oakland Motor Car Co.	Federal
Cumberland, Md.	W. J. Carter.	Velie
Easton, Md.	P. E. Corkron.	Dart
Boston, Mass.	Hanson Bros.	Sternberg
Boston, Mass.	Meyer Abrams & Co.	Lauth-Juergens
Boston, Mass.	Standard Motor Truck Co.	McIntyre
Boston, Mass.	Whitney Barney Co.	Lauth-Juergens
Boston, Mass.	Whitney-Barney Co.	Lippard-Stewart
Cambridge, Mass.	Whitney Barney Co.	Lauth-Juergens
Lynn, Mass.	J. Wm. O'Donnell, Jr.	Morgan
Lynn, Mass.	Charles E. Whittier.	Federal
Otis, Mass.	A. M. Hazzard.	Handy Wagon
Pittsfield, Mass.	Yon Brothers	Gramm
Somerville, Mass.	Brooks & Palmer.	Sanford
Detroit, Mich.	Thompson Auto Co.	Federal
Grand Rapids, Mich.	Overland Motor Car Co.	Federal
Saginaw, Mich.	Jerome Brothers	Cass
Duluth, Minn.	Electric Service & Repair Co.	Adams
Minneapolis, Minn.	A. F. Chase & Co.	Lincoln
St. Paul, Minn.	C. V. Sales Co.	Federal
St. Paul, Minn.	Pence Automobile Co.	Federal
Winona, Minn.	Winona Motor Co.	Monitor
Kansas City, Mo.	International Harvester Co.	I. H. C.
Kansas City, Mo.	Southwest Motor Co.	Reo
Kansas City, Mo.	White Motors Co.	White
St. Louis, Mo.	Brown Auto Co.	Federal
St. Louis, Mo.	Capen Motor Car Co.	Autocar
St. Louis, Mo.	Kingman Plow Co.	McIntyre
St. Louis, Mo.	Missouri Car Co.	Alco
St. Louis, Mo.	Bert J. Weber.	Poss
Butte, Mont.	E. Wiley Hill.	McIntyre
Hastings, Neb.	E. H. Brandes.	Gramm
Manchester, N. H.	Manchester Auto Garage	Federal
Jersey City, N. J.	J. Muldoon	Handy Wagon
Newark, N. J.	B. F. Adams.	Federal
Newark, N. J.	Newark Power Wagon Co.	Lippard-Stewart
Newark, N. J.	Hoagland-Thayer, Inc.	Adams
Albany, N. Y.	Central Automobile Co.	Adams
Albany, N. Y.	McIntyre Auto Sales Co.	McIntyre
Albany, N. Y.	Troy AutomobileExchange.	Lippard-Stewart
Auburn, N. Y.	Edward A. Ross.	Federal
Binghamton, N. Y.	H. W. Brown.	Alco
Brooklyn, N. Y.	Sterling Place Garage.	Lippard-Stewart
Buffalo, N. Y.	Sanderson & Burghardt.	Federal
Buffalo, N. Y.	L. G. Schoepflin Co.	Adams
Buffalo, N. Y.	Werick Bros. Motor Car Co.	McIntyre
Catskill, N. Y.	Amos Post	Gramm
Elmira, N. Y.	Chemung Motor Co.	Dart
Gloversville, N. Y.	J. August Schmidt.	McIntyre
Hoosick Falls, N. Y.	J. E. Van Wert.	Gramm
Ithaca, N. Y.	D. F. Head.	McIntyre
Little Falls, N. Y.	F. B. Austin.	McIntyre
New York City, N. Y.	Russell A. Clapp.	United States
New York City, N. Y.	A. F. Peck.	Federal
Peekskill, N. Y.	Lawson Motor Car & Garage Co.	Federal
Poughkeepsie, N. Y.	Ryder Motor Co.	Lippard-Stewart
Rochester, N. Y.	Turk & Brown.	Lippard-Stewart
Schenectady, N. Y.	J. J. Acker.	McIntyre
Syracuse, N. Y.	James Auto Co.	Federal
Syracuse, N. Y.	W. R. Shaw.	Kelly
Syracuse, N. Y.	Syracuse-McIntyre Co.	McIntyre
Troy, N. Y.	Troy AutomobileExchange.	Lippard-Stewart
Webster, N. Y.	McIntyre Auto Sales Co.	McIntyre
Durham, N. C.	T. B. Lyon Motor Car Co.	Alco
Ashtabula, O.	High-Level Auto Co.	Gramm
Canton, O.	Monnot & Sacher.	Auglaize
Cincinnati, O.	Cincinnati Motor Truck Co.	Federal
Cincinnati, O.	White Motor Car Co.	White
Cleveland, O.	Alco Motor Car Co.	Alco
Columbus, O.	Adamson Automobile Co.	Blair
Columbus, O.	Mr. Dean DeWitt.	Lippard-Stewart
Columbus, O.	Kimmel Bros.	Auglaize
Columbus, O.	Oscar Lear Motor Car Co.	Modern
Covington, O.	J. H. Hecker.	Auglaize
Dayton, O.	Hosier Overland Sales Co.	Dart
De Graff, O.	Lockhart Bros.	Auglaize
Delpho, O.	Mueller Implement Co.	Auglaize
Hillsboro, O.	James E. Roads.	Gramm
Marion, O.	Hoyles & Mayer.	Auglaize
Springfield, O.	Harry A. Day.	Auglaize
Toledo, O.	Atwood Auto Co.	Federal
Toledo, O.	Baumgardner & Kibby.	Marathon
Toledo, O.	L. L. Blood.	Reo
Toledo, O.	W. H. Dennis.	Alco
Zanesville, O.	Price Implement Co.	Auglaize
Portland, Ore.	Michigan Motor Co.	Lippard-Stewart
Portland, Ore.	Stoddard-Dayton Auto Co.	Federal
Allentown, Pa.	William & C. W. Angle.	Alco
Butler, Pa.	Butler County Auto Co.	Federal
Chester, Pa.	Gallagher Bros.	Dart

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Erie, Pa.	J. Burton Arbuckle	Gramm
Erie, Pa.	Park Auto Co.	Alco
Harrisburg, Pa.	William J. Mehring	Alco
New Berlin, Pa.	H. H. Maurer	McIntyre
Patton, Pa.	Ferrell Auto Co.	Federal
Philadelphia, Pa.	Automobile Repair&Sales Co., Inc.	Sandusky
Philadelphia, Pa.	A. C. Fischer	Ford
Philadelphia, Pa.	C. F. Knuth	Service
Philadelphia, Pa.	Lovegrove & Co.	McIntyre
Pittsburgh, Pa.	Bestel Motor Car Co.	Velie
Pittsburgh, Pa.	Cartney Bros.	Indiana
Pittsburgh, Pa.	A. DeRoy Co.	Gramm
Pittsburgh, Pa.	Taylor Motor Car Co.	Lippard-Stewart
Reading, Pa.	Marathon Motor Sales Co.	Lippard-Stewart
Scranton, Pa.	Mack Bros.	Hewitt
Sizerville, Pa.	D. D. Sizer	Handy Wagon
Wilkes-Barre, Pa.	D. & H. Auto Co.	Gramm
Williamsport, Pa.	Charles E. Chadwick	Chase
Porto Rico, W. I.	Melchior, Armstrong & Dessau	Alco
Providence, R. I.	Woodworth & Dickinson	Federal
Chattanooga, Tenn.	J. D. Harvey	Federal
Memphis, Tenn.	F. A. Burmeister	McIntyre
Memphis, Tenn.	A. W. Whitaker Co.	United States
Nashville, Tenn.	Imperial Motor Car Co.	McIntyre
Dallas, Tex.	Ley-Kramer Automobile Co.	Alco
San Antonio, Tex.	Peden Iron & Steel Co.	Alco
San Antonio, Tex.	Commercial Auto & Repair Co.	Adams
Waco, Tex.	Waco Auto Co.	Adams
Richmond, Va.	Oakland Auto Co.	Federal
Everett, Wash.	Ferrell Auto Co.	Federal
Sedro Wooley, Wash.	W. H. Heinzerling	Lippard-Stewart
Spokane, Wash.	L. D. McCarthy	Jeffery
Spokane, Wash.	Pacific Motor Car Co.	Federal
Wheeling, W. Va.	Hearne Motor Co.	Kelly
La Crosse, Wis.	Fox Bros.	McIntyre
La Crosse, Wis.	La Crosse Plow Co.	Dart
Milwaukee, Wis.	Chicago Pneumatic Tool Co.	Little Giant
Milwaukee, Wis.	Franklin Auto & Supply Co.	Alco
Milwaukee, Wis.	Motor Service Co.	United States
Oshkosh, Wis.	Meter Electrical Const. Co.	Auglaize

DOELGER DISPENSES WITH HORSES.

One of the most significant victories yet credited to the power wagon is that reported from the traffic office of Peter Doelger, the well-known brewer of New York City, in the admission that Mr. Doelger's last 15 horses have been offered for sale and within a few days the establishment will trust its entire delivery and utility service to motor trucks. This fact becomes the more interesting when it is noted that when Mr. Doelger bought his first machine three years ago, he owned and worked over 70 trucks and not less than 175 horses.

Mr. Doelger's conversion to motor transportation has come steadily and gradually. When he first bought an electric wagon he did so with many misgivings and in an entirely experimental way. One by one, he has added to his fleet until he has today 38 electric trucks, 16 more being made for his orders and 8 gasoline wagons, a total of 62. In announcing the complete abandonment of horses, even to the substitution of motor vehicles for factory and yard utility, he has the distinction of being the first brewer entirely to commit his work to motors.

Some time ago when Mr. Doelger had only 30 motor wagons his traffic manager, Jean E. Blaize, was quoted as saying that those machines saved him $25,000 a year over the same capacity by horses, and on this basis it is estimated that his saving is not far from $40,000 a year. In addition to this economy Mr. Doelger's abandonment of horses has led to the demolition of stables 200 by 100 feet, on half of which he has since erected a large bottling and shipping building. Last year he erected on one of his three wagon yards a garage 85 by 100 feet, at first two stories high with garage capacity for 24 motor wagons, and will this spring raise it three stories to provide complete accommodations for 96 machines and a traffic office. Out of the remnants of the stable site and wagon yards the plant now has available a plat equal to ten city lots for further building extensions, land once needed to house the horses and trucks.

Mr. Doelger and the General Vehicle Company, which sold him 54 of his electric trucks, are both immensely pleased at this first complete displacement of horses in a large delivery plant. The equipment is largely 5-ton units, with a few of 3½-ton capacity, and the "G. V." Company is now evolving a utility wagon for use around the brewery yard.

Another large brewery which is gradually working toward the same end is that of Jacob Ruppert, where there are now employed 72 electric and 21 gas machines. This plant, however, still uses something like 100 horses, but is reducing them in favor of motor trucks as fast as is practicable.

MINUTES OF N. A. A. M. CONVENTION.

Minutes of the meeting of Commercial Motor Vehicle Manufacturers held in New York on March 4 and 5, at the call of the National Association of Automobile Manufacturers, have been published in pamphlet form and are available for distribution. Application for copies should be made to H. W. Perry, Secretary Commercial Motor Vehicle Committee, N. A. A. M., 7 East 42nd street, New York City.

CHICAGO MOTOR RUN POSTPONED.

The motor wagon reliability contest, under the auspices of the Chicago Motor Club and originally scheduled for May 14-17, has been postponed. It is proposed to hold it immediately preceding the "fall opening" show of the Chicago Automobile Trade Association, during the early fall this year.

HEARST AUTOMOBILE BUILDING.

William Randolph Hearst, well known as a newspaper and magazine publisher and in other lines of work, will erect a 4-story, marble-fronted automobile building in New York, on the block bounded by Columbus Circle, Central Park West, Broadway and 61st street. There will be provision made on the ground floor for 19 stores, designed especially for automobile dealers.

B. F. BOARD COMMITS SUICIDE.

Suffering from a nervous breakdown, Benjamin F. Board, 36 years old, committed suicide on March 19 last by jumping from the top of a 100-foot water tower at the residence of his father-in-law, W. R. Powell, Wake Forest, N. C. Less than a year ago he organized and became president of the B. F. Board Motor Truck Corporation, Alexandria, Va.

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Motor Bus Notes.

Popular Demand for Motor Bus Transportation Shows No Sign of Abating.

Fort Smith, Ark.—The Goldman Hotel has installed a 10-passenger motor bus to ply between the hotel and the railroad depots.

* * *

Fresno, Cal.—The Coalinga Auto Stage Company has moved its headquarters from the Empire garage on East E street to the Eagle garage on West E street. The motor buses will continue to leave Coalinga for the Limited from the Fresno Pool hall and Smith Brothers' store on schedule time. A ladies' waiting room for lady passengers has been arranged at the Smith Brothers' store.

* * *

Fort Bragg, Cal.—Len Barnard, of this place, has purchased a 1-ton machine for use between Willits and Shake City, in Mendocino county, for carrying passengers, mail, express and freight.

* * *

Sacramento, Cal.—The Hotel Stockton has acquired a magnificently equipped, single-decked, 18-passenger motor bus. The Clayton Hotel also has ordered a 12-passenger motor bus.

* * *

San Diego, Cal.—A motor bus line will shortly supersede the present horse service between Foster and Julian.

* * *

Pueblo, Colo.—A 28-passenger motor bus has been placed in service between the zinc smelter and the corner of Third and Main streets. Employes are charged 5 cents, others 15 cents. The machine cost $4,500.

* * *

Washington, D. C.—Six or eight 20-passenger gasoline motor buses will be placed in service after May 15 between Washington and Brandywine. The trip will be made in 2 hours, as against the 3 hours taken by the railroad, on which only one train a day is run. Five trips a day will be made by the machines. Charles N. Semmes is the promoter. A motor freight line will later be inaugurated.

* * *

Evansville, Ind.—F. L. Hisgen, a real estate man of this city, is considering the installation of a motor bus line.

* * *

Gary, Ind.—The Motor Bus Transit Company has been formed, with a capital of $20,000, by F. M. Stults (president), C. W. Gettins (vice president) and J. F. Grantham (secretary and treasurer), all of Gary. One machine has been placed in service between Fifth avenue and the American Sheet and Tin Plate works. Three others will shortly be added, and 15 machines have been ordered in one lot from a well known maker. Each bus will carry 40 passengers. The fare is 5 cents.

* * *

Lafayette, Ind., will install a motor bus service between the State Soldiers' Home and the street car line.

* * *

Detroit, Mich.—After closely questioning Park Commissioner Hurlbut as to the performance of the four pay-enter motor buses now in operation by the city on Belle Isle bridge, the parks and boulevards committee of the board of estimates decided to allow him four of the five additional buses for which he asked. This will make an equipment of eight buses, seating 29 persons each and carrying 35, and making the round trip from Jefferson avenue to the casino in 20 minutes, or a 2½ minute service in rush hours. The buses cost $5,160 each last year. The item of $28,000 for the motors and completing approaches to the garage looked large to the committee, but the commissioner did a little figuring and showed that the two which were in commission during the last season had amply justified their purchase. The two machines carried 290,452 passengers last year. Thirteen phaetons carried 127,000, and nine motor buses privately operated carried 304,000. The gross revenue from the buses and phaetons was $14,500; operating expenses $14,600. Because of three rates of fare, it was impossible to tell the exact earnings of the buses. Their share in the expense of maintenance was a trifle more than $8,000, indicating that they had paid a profit to the city.

* * *

St. Paul, Minn.—Twelve motor buses, each with a seating capacity of from 12 to 15 passengers, will be placed in service between St. Paul and Minneapolis by the Twin City Motor Transit Company (A. L. Hazer, president). A 30-minute service will be installed, with cars starting from each city every ten minutes.

* * *

Hastings, N. Y.—The Post Road Transportation Company has been incorporated, with a capital of $100,000, by George T. Brown, Cyrus F. Judson and Paul Hayes, to operate motor buses for hire.

* * *

Seneca Falls, N. Y.—The Seneca Falls and Ithaca Transfer Company (S. Y. Ditchfield, president) on April 15 resumed service from Seneca Falls south through the county to Ithaca and thence to Cortland by way of Freeville. Two round trips daily are being made between Ithaca and Cortland, and one on the Seneca Falls and Ithaca line. Four machines are in service.

* * *

Cincinnati, Ohio.—Charles Christian Wise, of Oakley, is endeavoring to inaugurate a motor bus service, patterned after that of Berlin, Germany, which operates 200 motor buses of 50-passenger capacity each and pays 8 per cent on a capitalization of $3,250,000.

* * *

Klamath Falls, Ore.—W. L. Clapp has opened the motor bus season between this city and Lakeview a month earlier than usual.

* * *

Ashland, Pa.—Nelson T. Brindle and William Weir are promoting a motor bus company to operate between this place and Fountain Springs and later between Ashland and Gordon. A 20-passenger motor bus has been ordered. A hiring business will also be conducted.

* * *

Mercer, Pa.—The Sharon Auto Transit Company has been chartered with a capital of $5,000 to operate a motor bus service between Sharon and Mercer. Two 10-passenger motor buses have been ordered. Four trips daily will be made. The incorporators are James H. Hoffman, George Burdick, R. B. Graham, of Sharon, and F. G. Adams, of Cleveland, Ohio.

* * *

Chehalis, Wash.—Mr. McMillan, of Tacoma, has inaugurated a daily motor bus service from Chehalis to Mossyrock and Riffe.

* * *

Spokane, Wash.—Daily trips by motor bus are being made between Priest River and Coolin, on Priest Lake. H. S. Hawley has been awarded the bus contract by the Great Northern Railroad.

* * *

Tacoma, Wash.—Ten dollars for a round trip fare between Tacoma and Longmire Springs by motor car is the price fixed for a service under consideration by the Commercial Club of this city.

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REQUISITES OF EFFICIENCY.

"Most of those who are in any degree familiar with motor trucking will accept it as an established fact that the better motor wagons are efficient from the standpoint of machinery and that they are capable of doing much more work than horses," said a representative of the Peerless Motor Car Company's truck department the other day.

"The real problem in motor trucking now concerns the reformation and readjustment of conditions and customs that have grown up around beast haulage, so that the truck may have full play in the realization of its potential efficiency. It is simply a matter of saving time, of keeping the truck moving so that its motion minutes will exceed to the largest possible extent, its stopped time.

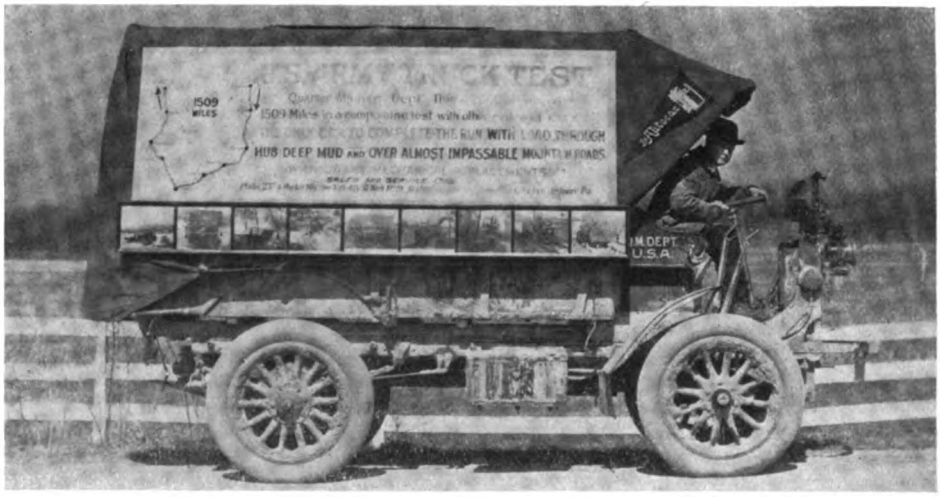
"Arnold Bennet calls time 'the raw material of everything.' It is indeed the raw material of motor truck service. But this should not be misunderstood. It does not mean that the truck should be speeded up. Under favorable conditions our present normal truck speeds of 10 to 15 miles an hour are sufficient to revolutionize our street and highway transportation.

"The problem is to reduce the truck's stopped time by bringing the efficiency of the methods used in loading and unloading up to the efficiency of the truck. It includes also such traffic arrangements as will permit the truck to proceed at its normal speed through the streets.

"Other transportation agencies are affected by the same conditions. Louis D. Brandeis recently attributed one of the greatest leakages in the system of railroad management to the needless stopped time of rolling stock in the yards. The great ore and grain boats which ply on the Great Lakes owe their efficiency very largely to the fact that they are loaded and unloaded with amazing speed. Ten thousand tons of ore have been put into one of the great carriers of the Pittsburgh Steamship Company in 25 minutes—it is always done in less than two hours. The same cargo is unloaded in from 3½ to 5 hours.

"Quick work at the terminals is just as valuable in the operation of the motor truck. Delays are costly not alone because they mean a tied up investment, but because they rob the truck of an opportunity to create values, what the economists call place values, in excess of the amount represented by interest on the truck investment.

"Successful co-operation in motor trucking is a three-cornered affair. It must include the shipper, the truck operator and the receiver, whether all three happen to be parts of a single company or are separately managed. The more complete the co-operation, the more work the truck will do and the greater will be its value.



The Autocar which made a remarkable record in the 1509-mile U. S. army reliability run.

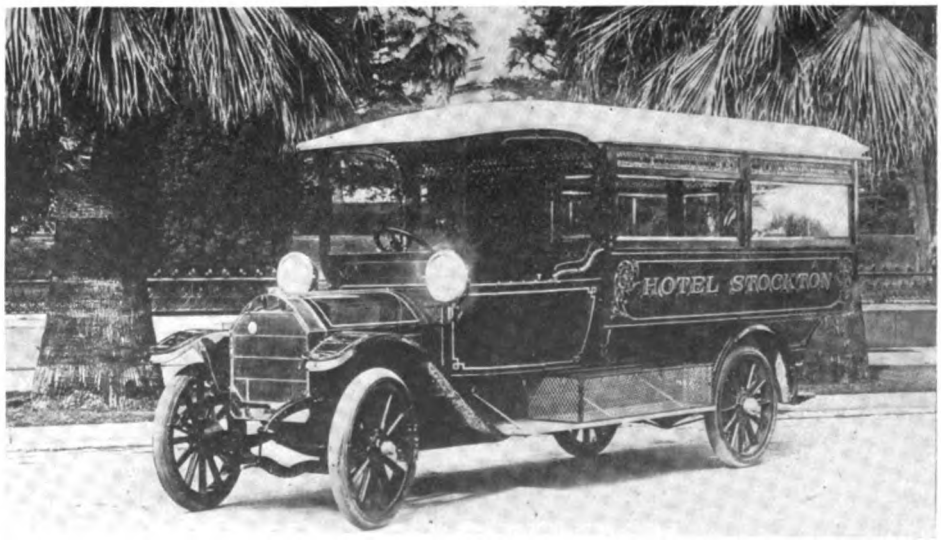
"One firm of building supply dealers with which I am acquainted, by making an investment in hoppers and other quick loading devices, has increased the efficiency of its trucks, far beyond what was necessary to make the equipment pay for itself. But at the other end of the truck trips it has beast haulage conditions to contend with.

"Building contractors are still blind to the advantages of co-operating with the dealer in his truck operation. They place their concrete mixers in places inaccessible to trucks. Thus they delay the unloading process, reduce the motion minutes of the truck and impair its efficiency. By so doing they are also delaying their own deliveries.

"Retailers who receive motor truck deliveries from wholesale houses are equally indifferent to their own interests, chiefly because they do not realize what motor truck service means, or might mean, to them. By tardy receipt of consignments they keep the truck standing idle, delaying freight for the next man on the route as the one before delayed theirs. Co-operation here would keep things moving for the benefit of everyone.

"Wharves for the exclusive use of motor trucks would be a great help at water shipping points. Trucks are now delayed by slow moving teams. Suitable hoisting devices installed on such wharves would greatly reduce the truck's stopped time.

"Our greatest truck problem, to sum up, concerns not the truck itself, but the manner of its use. We need to key every feature of the transportation system up to the efficiency of the truck. The motor truck has been so badly needed for the last decade that it will not take long to work the problem out when its importance is thoroughly understood. The wonderful things already accomplished by the motor truck bring home the necessity of the solution."



This picture of a KisselKar hotel bus is an example of the beauty and design that can be put into a power vehicle of this kind. It was specially constructed for the Hotel Stockton at Stockton, Cal. It has a mosaic roof, drop windows of bevel plate glass, leaded glass borders, magnificent upholstery, and is lighted by electricity.

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AMONG THE MAKERS.

Comprising Principally the Plans of New Motor Wagon Manufacturers.

Los Angeles, Cal.—H. G. Wells, formerly engineer with the International Harvester Co. and now with the Union Tool Co., is superintending the formation of a motor company in the new city of Torrance. It is reported that contracts have been signed by the Union Tool Company and the Dominguez Land Company for the construction of a $500,000 motor wagon factory and a $60,000 plant for the making of traction plows. The motor wagon factory will measure 225 feet by 350 feet, and will be constructed of solid steel and concrete.

* * *

Redlands, Cal.—T. Nat Gibson, of Los Angeles, is in charge of the construction of a motor wagon factory for the Redlands Machine & Auto Co., at Sixth and State streets.

* * *

San Francisco, Cal.—The Doane Motor Truck Co. has evolved a new style of 5-ton power wagon with an unusually low body, making it accessible for loading and unloading of heavy freight.

The F. L. Moore Motor Truck Company has been incorporated in San Francisco with a capital of $250,000 by Frank L. Moore, Albert Roberts, H. F. Stewart, H. B. Bates and Allan T. Archer.

* * *

Chicago, Ill.—The Fairbanks-Morse Co. is building an 80 by 130 foot extension to its Eclipse works at Beloit, Wis., to keep up with the growth of its gasoline tractor business.

* * *

Davenport, Ia.—The East Davenport Machine Shop is building two trial motor wagons for local concerns and plans to go into the business if they prove successful. Another motor wagon company is being promoted here by the Davenport Industrial Investment Co.

* * *

Lawrence, Mass.—The Lambert-Morin Motor Vehicle Company, after three years of successful experiment, is increasing its manufacturing facilities. The company is now specializing in electric wagons.

* * *

Bay City, Mich.—The Wenonah Motor Truck Co. has been organized in this city by A. B. Perkins (president), his three sons, and G. E. Porter (manager and chief engineer). C. R. Perkins is secretary and treasurer. The company will produce models of 1,000 to 1,500 pounds capacity, and possibly also 1 ton. The first machine was recently completed in a building in Third street, between Water and Saginaw streets. A factory formerly occupied by the Pierce-Nye-Budd Company, situated at the corner of Eleventh and Saginaw streets, has been secured.

* * *

Detroit, Mich.—The Universal Motor Truck Company is building a new 6-cylinder machine to the design of W. H. Cameron. It is rumored that the Universal plant may shortly be removed to Milwaukee.

The Wagenhals Motor Car Co. has secured capital in Detroit and will shortly take a factory for the production of motor tricars.

A well known eastern manufacturer of pleasure cars, who prefers to be nameless for the present, has been to Detroit to look for a suitable site on which to establish a motor wagon factory.

* * *

Grand Rapids, Mich.—The association of commerce of this city has been approached by the American Steam Truck Company, of Lansing, with a view to securing a location here.

The Van-L Motor Car Company, maker of a 1-ton motor wagon designed by George W. Van Antwerp, the designer of the original Grabowsky truck, has been reorganized and is now known as the Commercial Service Truck Company. The company has had some flattering offers to locate in other cities, but it is believed that through the efforts of the Central West Improvement Association and the Association of Commerce it will be induced to stay here.

* * *

Menominee, Mich.—D. F. Poyer & Co. have acquired the Andrew Gram factory building and machine shop, and as soon as the equipment can be arranged, will launch the manufacture of the "Menominee" motor truck on an extensive scale and begin a campaign to bring their motor wagon into national favor. Seventy-five men will be immediately employed and the factory will start with orders already on hand for 300 motor trucks for this season's delivery. The Main street garage of D. F. Poyer & Co. will remain undisturbed. It will also continue to be the office and sales rooms of the factory and will be in charge of L. Philip Fortin.

* * *

Mt. Clemens, Mich.—The Markey Manufacturing Company has been organized to make a front-wheel-drive motor wagon invented by the gentleman for whom the company is named. A 3-ton machine has been made and satisfactorily demonstrated.

* * *

Luverne, Minn.—The Luverne Automobile Mfg. Co. will soon place on the market a 1-ton motor wagon, with 40-hp. motor and furnished with a standard covered body.

* * *

Omaha, Neb.—The Omaha Motor Car Company, authorized to capitalize for $1,000,000, is making a full line of motor wagons of from 1 to 5 tons capacity, as well as pleasure cars. A new factory, 125 by 400 feet, will shortly be built.

* * *

Perth Amboy, N. J.—The Wonderland Beach Company, formed three years ago to conduct an outdoor amusement place on the shore of the Raritan River at the foot of Second street, has accepted the offer of the Continental Engine Company of Chicago, and the latter will take possession at once. It is announced that a plant for the construction of motor trucks will be erected on the site, which measures 330 by 575 feet in size, and has railroad and water transportation facilities. The Wonderland company never opened its proposed resort after acquiring the property.

* * *

East Orange, N. J.—The Kadix Newark Motor Truck Company has been incorporated with a capital of $200,000 by G. F. Kallberg, L. L. Dann (both of East Orange) and R. M. Colburn (of Newark) to manufacture motor wagons.

* * *

Newark, N. J.—The Atlantic Vehicle Co. has been organized here with a capital of $390,000 to manufacture electric motor wagons. A temporary factory at Oraton street and Verona avenue has been secured and the machines that will be made are practically ready for production. McKinley Boyle (president and secretary), Ralph Singer (vice president and sales manager) and M. Black (secretary) are the principal officers of the company, which is said to comprise no less than seven multimillionaires among its backers. Arthur J. Slade is the chief engineer, and has designed a line of 1, 2, 3½ and 5 ton electric wagons which will sell at from $2,400 to $4,000. It is reported that electric motors of new and improved design will be used, made by the General Electric Company. The general offices of the new company are at 1600 Broadway, New York City.

* * *

Brooklyn, N. Y.—The Powell Engine Corporation, which formerly built marine and stationary engines, is now putting on the market a new design of motor wagon with a removable power plant.

* * *

Buffalo, N. Y.—The Eadie Vehicle & Gear Company has been incorporated by John M. Eadie, George P. Keating, Seward H. Milliner, William J. Donovan, and Howard G. E. Smith, with a capital of $200,000.

* * *

Corning, N. Y.—The Corning Business Men's Association is considering a proposition for the establishment of a motor wagon factory in this city, to employ 300 men from the start and manufacture a light machine to sell at a low price.

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Geneva, N. Y.—Cram & Sovereign have begun the manufacture of a 1,500-pound motor wagon.

* * *

Charlotte, N. C.—The Owens Wagon & Automobile Works have acquired the Charlotte Wagon Works and will build motor wagons. The new concern is capitalized at $50,000.

* * *

Cincinnati, Ohio.—The Cincinnati Motor Company, organized by Frank Older, J. B. Doan and H. T. Alder, has purchased the plant of the old Power Car Company and will build both power wagons and pleasure cars.

* * *

Cleveland, Ohio.—The Willard Storage Battery Co. is building a factory addition, including 25,000 square feet of floor space.

* * *

Covington, Ohio.—Local and Pennsylvania men will shortly establish a motor wagon factory with ample capital and capable of an initial yearly output of 500 machines. The Industrial Club engineered the deal.

* * *

Kenton, Ohio.—The Leitner Motor Truck Company is about ready to start business, and will employ 25 men. The factory is on West Franklin street.

* * *

Portland, Ore.—The Ewbank Power-Transmission & Motor Company, organized about 6 months ago, has constructed its first gasoline-electric motor wagon, which is being demonstrated in fire engine work, a separate electric motor being used to drive the pump. The company plans to construct an extensive plant for the manufacture of motor wagons, railroad motor car and fire apparatus. The officers are: S. M. Mears, president; George W. Stapleton, vice president; R. S. Howard, treasurer; Dr. H. B. Ewbank, secretary. H. E. Ewbank, Jr., will have entire management of the manufacturing and engineering.

* * *

Allentown, Pa.—John M. Mack, who is largely interested in the Lansden Company, besides being one of the leading spirits of the International Motor Company, which controls the Saurer, Mack and Hewitt properties, is said to be in favor of building a branch factory in Allentown for the manufacture of electric wagons.

* * *

Houston, Texas.—The Twyford Auto Mfg. Co., which controls patents on a four-wheel-drive motor wagon, is endeavoring to sell the balance of its $400,000 stock through the National Fiscal Agency, 716 Carter building, Houston, in order to increase its manufacturing facilities.

* * *

Milwaukee, Wis.—The Sigmund Auto Truck Company has been incorporated by Nicholas W. Marx, Benjamin P. Marx, and Jesse L. Stroede, with a capital of $50,000.

* * *

Superior, Wis.—The Continental Truck Manufacturing Company has been incorporated by J. G. Barndale (secretary and treasurer), E. M. Anderson (president), and Mabel Rauner, with a capital of $50,000. Motor wagons of 1 and 3 tons capacity will be made. This concern succeeds to the business of the Barnsdale Auto Company.

PACKARD'S GREAT RECORD.

Power wagon history contains no more wonderful story of progress than that of the Packard Motor Car Company, of Detroit, Mich., which is content always to stand by the record of the machines it has in service, as witness its well-known slogan: "Ask the man who owns one." Of the first 25 purchasers of Packard trucks, all of whom bought in 1908, repeat orders have been received from 14, or 58 per cent. The total number of trucks, purchased by the 14 repeating owners is 69. Of the 11 who did not repeat, several found the original purchase adequate to take care of their delivery.

Shipments of Packard trucks in March were 85 per cent. larger than in any previous month.

Sales of Packard trucks in March were 50 per cent. greater than the corresponding month last year.

Swift & Company, in buying trucks for their Chicago plant and various branches, have placed repeat orders 15 times. Eighty Packard trucks are being used in the packing business.

The American Express Company, which has 23 Packards in use, has placed a quantity order for 50, the first instalment of which has been delivered.

Other large express companies, which have made exhaustive inquiries, are now buying heavily under quantity contracts. There are now 155 Packards being used in the express and transfer business throughout the country.

Eighty-one brewers are operating 166 Packard trucks, which are distributed in 43 cities.

Ninety-five Packard trucks are being used in the delivery service of large department stores, including the John Wanamaker establishment in New York, and the Marshall Field store in Chicago.

Fifty-three Packards are delivering furniture, 50 are engaged in general hauling, and 88 are being used in the grocery business.

These are merely detached examples. Packard trucks are being used in 154 distinct lines of trade.

The three-ton size has built up the bulk of this business. Last fall, after two years of experimenting, the first two-ton model was placed on the market. This truck was accepted at once and without question, the orders being placed for months ahead of possible deliveries. Kaufmann Brothers, of Pittsburgh, after experience with three-ton Packards, purchased 12 of the two-ton model without having seen a demonstrator.

Under the extreme conditions prevailing during the winter, not a single Packard truck, so far as we know, was laid up on account of the weather.

All of which explains in part why the company's new shops are turning out five trucks a day in an attempt to keep up with the orders.

PEERLESS STOCK ISSUE.

It is announced that the Peerless Motor Car Company of Cleveland will sell $1,100,000 6 per cent bonds and local banks have underwritten the issue. The company also will issue $300,000 additional stock. The proceeds of the bond and stock sale will be used to take care of the company's floating indebtedness, for working capital, and for the further development of its motor truck department. The Superior Savings and Trust Company is trustee for the bonds, and the Tillotson & Wolcott Company has been made sales agent for the issue. It is stated that $400,000 of the bonds have already been sold. The bonds are secured by a first and closed mortgage, and will mature serially in from 1 to 12 years.

GOODRICH CUTS MELON.

Transfer of the entire property of the B. F. Goodrich Co., Akron, Ohio, to a new company of the same name but incorporated under the laws of New York, is reported to have taken place on April 1 last. The old capital of $20,000,000 is increased to $45,000,000, divided into 450,000 shares of $100 each, 150,000 of these being 7 per cent cumulative preferred stock, and the rest, common stock. The preferred stockholders of the Akron company are given the option of accepting $120 per share in cash, or 1.2 shares of the preferred stock in the new company, while the old common stockholders will get 2.7 shares of new common and $78 in cash for each share of stock now held in the old company.

The Long Island Auto Truck Co., capitalized at $3,000, has been formed in New York City.

A notable demonstration of motor fire apparatus will be held during the South Carolina State Firemen's Convention in June.

John F. Engle, Indianapolis city prosecutor, maintains that state registration of automobiles precludes the legality of additional city taxes.

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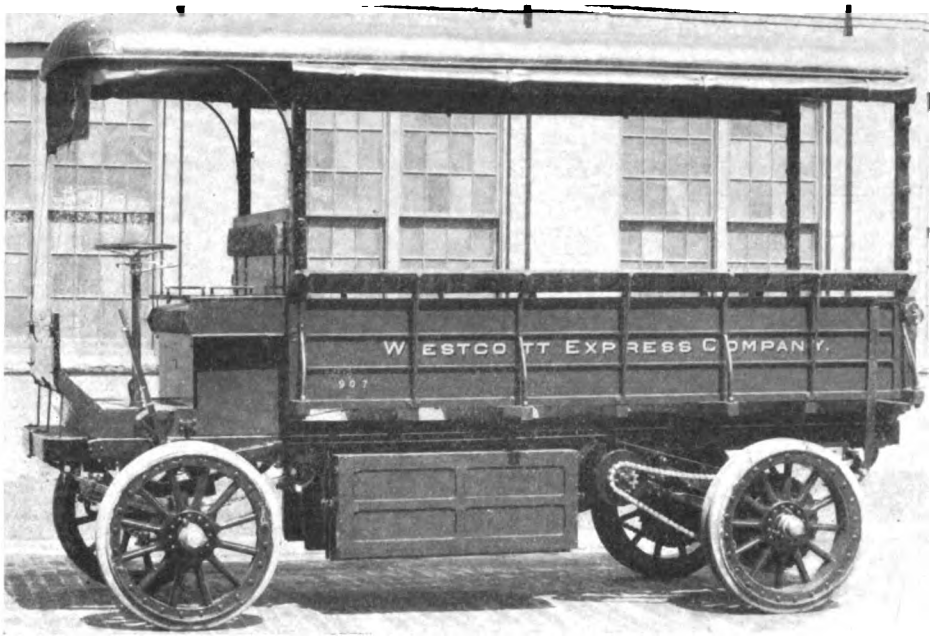

Baker 2-ton electric, one of 12 ordered by the Westcott Express Co.

BAKER BUSINESS BOOMING.

The Baker Motor Vehicle Company, Cleveland, Ohio, has just filled an order in less than 30 days from the Westcott Express Company of New York for 12 two-ton express trucks. Among other orders received by the Baker company since March 25 are 2 one-ton trucks to be used in construction work by the Public Service Gas Company of New Jersey, and a two-ton truck equipped with a collapsible extension tower for line work by the Public Service Railway Company of New Jersey.

A two-ton truck has just been shipped to the Denver Light & Power Company. A one-ton chassis has just gone to the Malden Electric Company, at Malden, Mass. The town of Peabody, Mass., has just purchased a 1,000-pound wagon.

Cambridge Gas & Light Company, Cambridge, Mass., has an especially built 1,000-pound Baker electric wagon. D. Goff & Sons, Pawtucket, R. I., has just been shipped a two-ton truck. The Southern California Edison Company was shipped recently a 1,000-pound emergency wagon for use in Los Angeles. F. M. Christianson & Son, Akron, Ohio, marble manufacturers, will shortly receive their one-ton truck which will be fitted with the body especially adapted for the hauling of marble slabs.

Announcement is made by the Baker Motor Vehicle Company, Cleveland, Ohio, that the Baker Electric Company of Michigan, was officially incorporated on April 3. The officers of this new factory branch of the Baker Company which will formally open some time between May 1 and 10 on Woodward avenue, Detroit, are J. Caldwell Walker, of Detroit, president; R. C. Norton, Cleveland, vice-president; Wm. C. Burnett, Detroit, secretary and treasurer. The new Baker sales room will be in the heart of the automobile row on Woodward avenue. The building which it will occupy is now rapidly nearing completion. The formal opening will be held early in May, when a complete line of Baker electric pleasure cars and commercial trucks will be shown. The new sales organization of the Baker company in this city succeeds the E. I. Rumsey Garage Company, the former dealers. However, the Rumsey people have a working agreement with the new Baker sales company, whereby it will act as service station for Baker and other electric owners in this city.

REYNOLDS WITH L-S CO.

W. F. Reynolds, who is a man of varied automobile experience, has recently become sales manager of the Lippard-Stewart Motor Car Company of Buffalo. In the fall of 1905 he took over the automobile business, "Sundries and Garage," of John Wanamaker, of Philadelphia, who operated there as the Rittenhouse Garage, at 23rd and Walnut streets. He continued in the location as a dealer, representing various lines of cars, until 1908, at which time he was placed in charge of the southeastern territory of the Franklin Automobile Company of Syracuse. For the past three years he has been in charge of the Pittsburgh branch of the Franklin Automobile Company.

On the last day of March the Packard Motor Car Co. shipped 27 pleasure cars and 23 motor wagons, valued at $200,000 in all.

The Goetz Brewing Co., Kansas City, Mo., is considering the installation of motor wagons on account of a walkout of 7 union teamsters.

KNOX AMBULANCE.

The demands of modern hospital practice require ambulances fitted with all possible conveniences, as it has been found that prompt attention to the condition of a patient while en route to the hospital is an important factor in effecting recovery, and this latest product of the Knox factory has been designed fully to meet these requirements in every detail.

The chassis is of standard Knox construction throughout, fitted with 40-hp., 4-cylinder motor of great flexibility, combined with the quiet, smooth running qualities which are so essential for ambulance service. It has a wheel base of 134 inches and is fitted with 38 by 5½-inch pneumatic tires, single on the front and dual rear. These large tires, combined with long semi-elliptic springs on the rear, afford extremely comfortable riding qualities.

It is in the body, however, that the chief interest centers, on account of its unique design and appointments. The body frame itself is of selected ash, strongly braced to ensure lightness with strength and freedom from all disagreeable squeaking and rattle. Sheet aluminum is used as the outside covering, made in large seamless panels, while the inside is sheathed with three-ply laminated white wood, which presents a very clean, sanitary appearance. The flooring is of ash, covered with linoleum.

Back of the driver's seat the body is divided into two compartments, the forward one having a door on either side and a folding seat facing forward for doctor's use. This compartment serves as a side entrance or passageway for the rear compartment and opens directly into the latter without any door intervening.

Directly behind this partition on one side of the vehicle are located the two cots, one above the other, supported on springs. Each cot is of the folding type, adjustable to any angle, and is supported by a metal tray into which it readily slides. Below the lower cot is a large locker for the convenient storage of medicine, etc.

Two folding seats are provided on the side opposite the cots, one at the head and the other at the foot of the cot, and between them, on the side of the body, is arranged a neat folding hot and cold water outfit with sink and drainage tube leading to outside of car. A small alcohol lamp serves to heat the water while en route to the patient.

In addition to the water heating outfit, a large thermos bottle is arranged with rubber tube and stop cock directly over an antiseptic tray and pad, while drinking cups are also provided in a convenient bracket.

Ample ventilation is furnished by three large shutter ventilators on each side,

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under the roof, while additional ventilation may be secured by dropping the windows in the doors. A window on the side opposite the cots, combined with the windows in the doors, afford excellent light, and double doors opening full width at the rear of the body give complete freedom for entrance and exit.

The interior finish of the body is a pure white enamel, while the exterior finish is also white with a fine gold stripe.

For night use the entire car is lighted with electricity furnished by a dynamo driven from the motor, excellent light being furnished for the interior of the car by two large dome lights in the roof. A storage battery for furnishing current when the motor is not running is kept automatically charged by the dynamo.

NEW CHASE APPOINTMENTS.

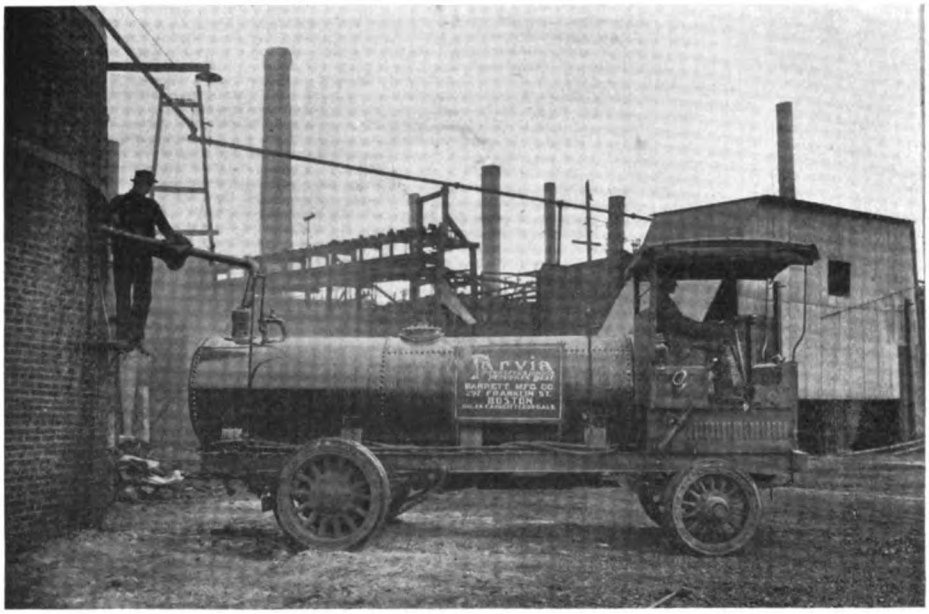
E. F. Howell of Buffalo, N. Y., has just been appointed district manager for the Chase Motor Truck Company. He will make his headquarters at the Philadelphia branch of the company, 1351 Ridge avenue, and his territory will include portions of Maryland, Pennsylvania and New Jersey, also the entire state of Delaware. Mr. Howell has just resigned from the sales department of the Buffalo branch of the Diamond Rubber Company with whom he has been connected for the last three years.

D. R. Linsley, formerly with the Pierce-Arrow Motor Car Company of Buffalo, N. Y., has accepted a position as salesman with the Chase Motor Truck Company. He will make his headquarters at Syracuse and travel through central and northern New York.

NEW SWINEHART AGENCY.

The Gessler-Williams Tire Co., 1312 Broadway, Denver, Colo., has taken an agency for the Swinehart tires.

J. B. Sherley, a farmer living near Harrod's Creek, Ky., will use portable residences mounted on motor wagons, for his laborers who hitherto have been hard to keep.



5-ton Alco, operated by the Barrett Mfg. Co., taking on a load.

FINE WORK BY ALCO.

The recent sale of 7 more Alco trucks to the Barrett Manufacturing Company on three different occasions within a month recalls the work done by the first four trucks that went a long way in influencing the subsequent sales.

The Barrett Manufacturing Company purchased its first two Alcos on April 7, 1911, and added a like number a month later. These trucks were put on duty for the New York and Boston offices. Three of them are equipped with the platform type of body, and the fourth, used in the Boston service, has a tank body.

Before choosing a particular make of truck the Barrett Manufacturing Company authorities invited leading manufacturers to demonstrate. The tests were long and severe, over the steepest grades and country roads to be found within a radius of Boston.

When the trucks were bought and placed in service a complete record of costs was kept, so detailed as to give an accurate statement of the amount of saving over horses possible by motor.

A month ago another Alco truck was specified for the Chicago service followed by the purchase of two for Philadelphia, and four more, or six all told, for Boston. The most recent sale brings the total number ordered by this company to eleven.

An interesting duty is that performed by the 5-ton truck fitted with a tank body. It has a capacity of 1,000 gallons of tarvia and hauls the material from reservoirs in Boston to nearby towns where the roads are being treated.

Taking every possible item into consideration this company reported that it was able to operate the truck for $12.37 a day in August, 1911. Figured in are the gasoline and oil expense, driver's and helper's wages, depreciation of the truck and tires, insurance and incidental expenses.

In return for this cost the truck during a month of 22 working days covered 1,187 miles, hauled 190 tons and made 38 trips. The average daily mileage was 54 miles, the average daily load 8.64 tons, and the average ton-miles a day 135.

The report for the month following, received from this concern, shows the estimated cost per day to be $12.54. In this month the truck covered more distance, but its aggregate tonnage was less. It traveled 1,246 miles, carried 165 tons and made 33 trips.

Knox ambulance fitted with every modern convenience.

ICE CREAM CO. BUYS FIVE.

A big ice cream maker of Buffalo, N. Y., has bought five Lippard-Stewart delivery wagons. They will have panel bodies and are to be painted an orange color striped in blue. All five cars are to be delivered by May 1.

Berlin's fleet of electric street washers will be increased to 24.

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On the heavy road through the forest.

REO CLIMBS MT. TACOMA.

A Reo 1,500-pound light delivery motor wagon made the run to Mount Tacoma during the past summer. The machine was loaded with 1,850 pounds of groceries and was driven by H. E. Stimpson, sales manager for the American Automobile Company of Tacoma, Wash.

Starting from that company's garage at 4 a. m. one Sunday morning, and taking the roadway over Pacific avenue hill, the car made Fern Hill and Parkland, 8 miles away in 45 minutes. It proceeded to Bismarck and from there straight through the virgin forest, emerging at Ohop Hill, a distance of 20 miles, where a short stop was made.

Crossing the valley the real climb commenced. The switchback road cut from the solid rock, hundreds of feet above the beautiful Nisqually river, was followed. The next stop was made in the heart of the forest a few miles from Elbe. Reaching Ashford about 12 o'clock, another stop was made. It was found that the road between that point and Longmire Springs was in bad shape on account of numerous rains, and the autoists were advised to discontinue the trip as it was predicted that they could not get through with the heavily-loaded motor wagon. Several cars had turned back and had given up the trip or the owners had left their cars and taken the stage the balance of the trip to Longmire Springs. It was decided, however, to push on. The worst roads on the trip were encountered the next ten miles. Several times the machine went down to the hubs in the heavy mud. Longmire Springs were reached at 2 p. m.

Between Ashford and Longmire Springs a stop was made at the government lodge where a $5 toll was collected for the privilege of running over the government road, and opportunity given for registering in the government book. But 7 gallons of gasoline were required in making the trip of 60 miles from Tacoma to Longmire Springs. Here an additional supply of 5 gallons was taken on, the machine was lubricated, and the run continued to Nisqually glacier, which is 4,000 feet high, and the highest point on the government road that machines are allowed to go.

At 9:30 a. m. the following day the descent of the mountain road began, the heavy load of groceries having been left at Longmire. Crossing Ohop valley the truck took Ohop hill on high gear, and the balance of the homeward trip was made in fast time, the car arriving in Tacoma at 6 p. m. An average of 12 miles an hour was averaged in going, and from 13 to 15 miles an hour was made on the return trip. Approximately 12 gallons of gasoline were consumed on the round trip of 144 miles, and one gallon of lubricating oil was used.

The groceries carried by the Reo on this unique trip to Mount Tacoma was a shipment from the Northwest Wholesale Grocery Company, of Tacoma, for the Harris Tourist Company at Longmire Springs, and it was specified by the purchaser that they should be at their destination by a certain time. On account of the C. M. & P. S. railway being unable to guarantee delivery by the specified time, the shippers were at a loss to find suitable conveyance until the Reo light delivery truck was recommended.

A. S. M. CO. INCREASES CAPITAL.

The Automobile Supply Manufacturing Company, of Brooklyn, N. Y., has prepared to increase its capital stock to $500,000, fully paid in. To meet the increased demand for its "Newtone" electric horn, the company has secured additional floors to its large plant, equipping the same with the most up to date modern machinery. The company employs several hundred workmen, who are working overtime. The Automobile Supply Manufacturing Company is said to have the largest plant in the United States for producing automobile bulb horns. It is further claimed that this concern was the originator of this line of business, and, for the last seven years, has supplied the bulk of the trade with automobile horns.

P. E. Simmons, of Portland, Me., has a Franklin truck which ran nearly 13,000 miles on the original set of tires. One of these tires has a record of over 20,000 miles. The machine covers from 40 to 100 miles a day. The wonderful part of it is that Simmons is in the piano and furniture moving business, and that the tires are pneumatics.

Reo delivery wagon on Ohop Hill, Mt. Tacoma road.

Reo delivery wagon at Nisqually Glacier, Mt. Tacoma.

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"Caterpillar" climbing Carlton hill, near Tacoma, Wash.

LUMBER MOTOR WAGON.

Two large lumber companies in Boston, Mass., are users of White motor wagons, the Curtis & Pope Lumber Company and the Downes Lumber Company. The former owns four White trucks and the latter two.

All of these machines are mounted with the characteristic style of bodies seen wherever lumber wagons are used throughout New England. This type of lumber wagon is almost as old as the industry in New England and no doubt it has survived because of its great adaptability.

The raised framework at the forward end of the platform is fitted with a roller which facilitates loading and unloading. On this type of wagon may be carried great long beams of lumber which it would not be possible to handle on an ordinary wagon. The raised framework on the forward part of the truck makes it possible for long timber to be carried further forward than could otherwise be done. It also makes it possible to balance the load almost perfectly and does away with the long overhangs at the rear of the truck or wagon.

It is not an uncommon sight to see one of the New England lumber wagons with its load extending way over the dash so piled about the driver that his head and shoulders are not visible.

To make motor wagons profitable in the lumber trade, the main thing to be avoided is long periods of idleness while the load is being assembled. When one size of lumber is piled here and another size there, scattered about a large lumber yard, a great deal of time is consumed in making up an order. To get around this difficulty an idler may be used, that is, a wagon with a platform that is interchangeable with the platform of the truck. This idler may be pulled about the yard by horses and when an order is made up the load may be transferred to the machine in about three minutes' time. With the use of this device the motor wagon may be kept constantly at work which enables it to produce maximum results. While the machine is off on a trip the idler is being loaded and when it returns the empty platform is exchanged for one that is loaded and in a few minutes the truck is ready to start on another trip.

BOSCH SERVICE.

Arrangements for special installation service have been made in all Bosch branches so that autoists in the vicinity of any branch desiring to have their present ignition systems changed to Bosch, may leave their cars at the Bosch garage and have the change made not only with promptness but at a reasonable figure with work of the usual Bosch quality and of course guaranteed.

The postmaster of Kansas City, Kans., is making an appeal to the U. S. postal authorities for a motor mail service in his city.

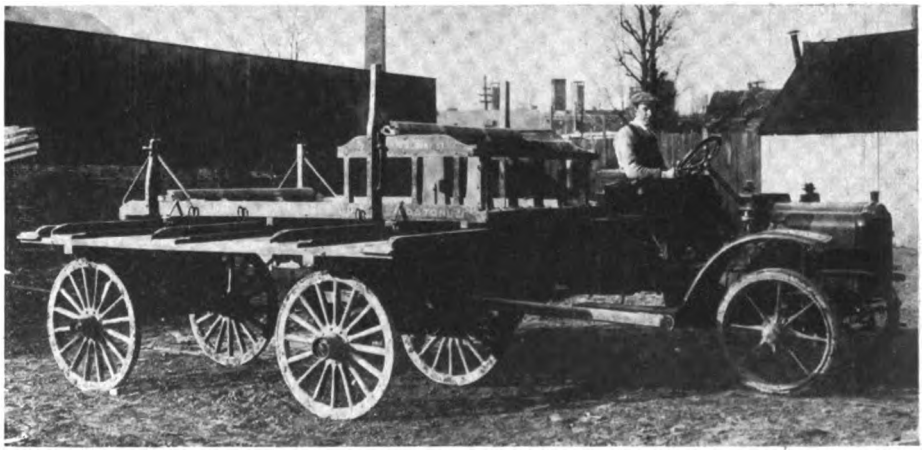
THE "CATERPILLAR" AGAIN.

The Holt Manufacturing Company, of Spokane, Wash., manufacturer of the "Caterpillar" traction engines, has recently made a number of successful demonstrations with these machines. The illustration shows a "Caterpillar" climbing the famous Mount Carlton, near Spokane, for the benefit of a prospective purchaser.

LARGE MOTOR BUS.

One of the largest motor buses in use in this country is one used by the Notre Dame College, Baltimore, Md., for conveying students between the Roland Park cars and the college. Its dimensions are comparable to those of a street car. The machine was made by the Grabowsky Power Wagon Company, is fitted with a 4-cylinder engine and equipped with electric lights.

The F. L. Moore Company of Los Angeles has over $100,000 worth of orders in hand, and is working to its full capacity.



White lumber wagon.

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A KisselKar truck in the service of the Kane & Trainor Ice Company, Stockton, Cal. This machine is demonstrating the value and economy of power in the delivery and transportation of ice.

NEW PLANT FOR CONTINENTAL.

The new Detroit plant of the Continental Motor Mfg. Co., of Muskegon, Mich., which has been under construction for some time, is now nearing a state of completion. This immense plant will more than double the large capacity of the Muskegon factory, which with an annual output of 18,000 to 20,000 gasoline motors, is far too small to satisfy the demand that has been created for "Continental" motors. It is situated on Jefferson avenue, adjoining the Hudson Motor Car Co. plant on the east, and is in that section of Detroit called Fairview.

The general construction and style of architecture which is similar to that of the Hudson company's buildings, is fireproof, of structural steel and reinforced concrete, with steel window sashes, and all other details of the most improved types. A sprinkling system has provided additional protection. Everything consistent will be done toward providing comfort for the Continental's army of employes. The main building is two stories high and over 500 feet in length. All rooms are exceptionally well lighted and airy, and scientific ventilation insures the best possible sanitary conditions at all times. A separate two story office building of artistic taste with its well made a move that will be essential to its arranged, modern and spacious offices, will add the finishing to this new magnificent plant.

The illustration shows the southwest corner of the main building, but does not give one a fair idea of its immense size, for behind this building are the test houses, heat treating plant, machine shop and the power plant with an available 1,000 horsepower. There will be more than 240,000 square feet of manufacturing floor space and the cost of construction will probably exceed $1,000,000. The factory itself covers 12 of the 30 acres of ground already purchased and is planned scientifically, so as to entail the minimum labor in the operation of the plant. The buildings are so arranged that any part of the plant may be extended at any time without interfering with the equipment already placed.

Despite this immense plant the Continental has no intention of abandoning its Muskegon factory for some time to come. The Continental plant in Muskegon is not small by any means, containing, as it does, 110,000 square feet of floor space. On account of the greatly increased volume of business for the coming year and furthermore to be in close proximity to its largest contract customers, the Continental has no doubt own as well as its customers' best interests.

The Continental Motor Mfg. Company is the successor to the Autocar Equipment Company, a co-opartnership established in Chicago as late as 1903, and claims to be the first exclusive gas engine manufacturing concern to introduce the successful type of four cylinder, four cycle, vertical motor for pleasure and commercial purposes.

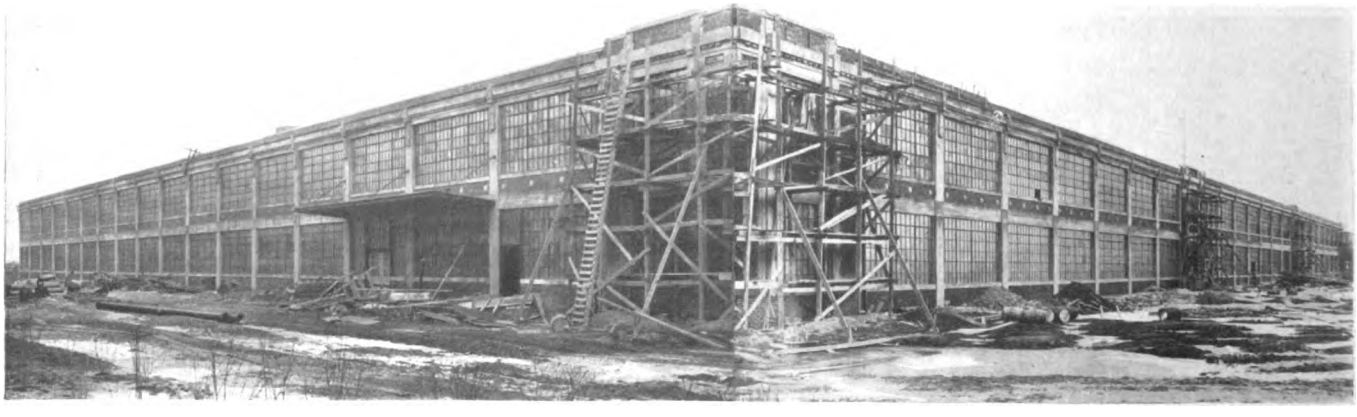
The rapid and substantial growth Continental has enjoyed under the successful administration of its president, B. F. Tobin, together with the high quality of motors it has always manufactured, leaves no room to dispute these claims.

BUICK CHICAGO SALES.

The Buick Motor Company truck department, Chicago branch, reports the delivery of light Buick trucks during the month of March to the following purchasers: C. Meschler, Chicago, Ill.; Acme Steel Goods Co., Chicago, Ill.; B. H. Lyon, Amboy, Ill.; Wm. Graham, Aurora, Ill.; Reeves Pulley Co., Chicago, Ill.; Chicago Mercantile Co., Chicago, Ill.; Ducker's Corner Grocery, Joliet, Ill.; Schrup Motor Car Co., Dubuque, Iowa (grocer); Schrup Motor Car Co., Dubuque, Iowa (contractor); Schrup Motor Car Co., Dubuque, Iowa (painter); A. J. Denney, Aurora, Ill.; Ralph Kline, Knox, Ind.; Moeller & Wilson, Dixon, Ill.; E. DeLue & Co., Chicago, Ill.; H. E. Chandler & Co., Evanston, Ill.; Adams & Elting Co., Chicago, Ill.

This list would have been considerably larger had it been possible to secure shipments from the factory, but considering the weather conditions and the car shortage, this showing indicates that the commercial field is certainly in a healthy condition and that this branch of the business is going to increase to a point where it will only be a question of the number of trucks which can be manufactured to supply the demand.

It was necessary, in order to make these deliveries, to have eight of the trucks shipped from the factory in flat-cars, as it was absolutely impossible to secure sufficient railroad equipment.



A portion of the immense new plant (now building) of the Continental Motor Mfg. Co.

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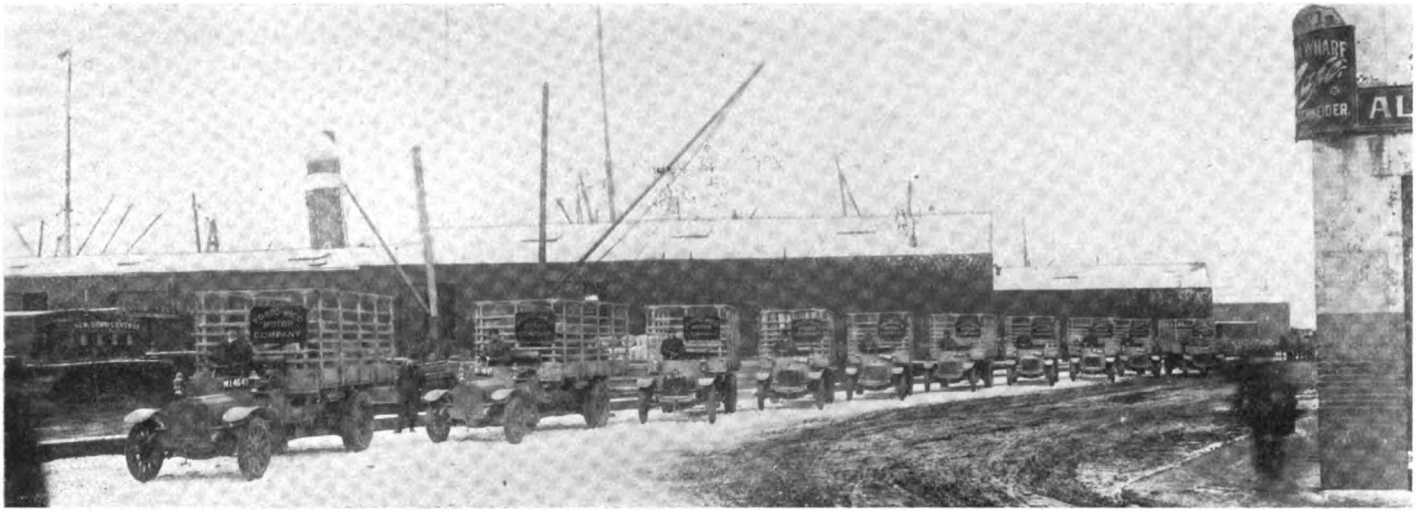


Ten International Motor Company's power wagons en route for Porto Rico—20 more to follow.

BIG ORDER FROM PORTO RICO.

The International Motor Company, of New York City, which handles the Mack, Saurer, and Hewitt power wagons, recently received an order for 30 heavy duty machines from a trucking concern in the island of Porto Rico. The order was placed after the International Motor Company's Traffic Department had made a detailed report after a thorough-going investigation. The illustration shows the first shipment of 10 machines.

NEW GOODYEAR SALESMEN.

The following salesmen were appointed by The Goodyear Tire and Rubber Company, Akron, Ohio, between April 1 and 12: George Bullock, Williard E. Parsons, San Francisco branch; G. R. Kreps, motor truck salesman, Philadelphia; M. J. Dobler, city salesman, New York City; Woodson Reese, covering Northern Missouri, out of the Kansas City branch; H. B. Annable, Spokane branch; H. C. Falkell, Cincinnati branch. G. G. Woodward, formerly motor truck salesman at New Orleans, now holds the same position at Memphis, Tenn.

The following additions were made during March: F. B. Sullivan and Myron T. Sparks, motor truck salesmen, Boston Mass.; Frank R. Isaac, motor truck salesman, Philadelphia, Pa.; E. C. Heid, Baltimore; Robert E. Campbell, St. Louis; E. F. Crawley, Jacksonville; J. B. Linerd, city salesman, New York.

V. D. Lersch, formerly at Cleveland, is now salesman at Buffalo. J. H. Whetstone has been transferred from Buffalo to the Detroit branch, and Glen Schrader, formerly of Indianapolis, is now at the Dayton branch. J. J. Kendall is now at the Charlotte branch, and H. Q. Tennant, formerly special sundries salesman at Atlanta, has been made inspector in the adjusting department. W. E. Dermody is city salesman at New Orleans, and G. T. Hancock has been appointed local branch manager of the recently opened Newark branch, New Jersey. C. E. DeVore and Carl Davidson are missionary salesmen at Cleveland, and W. M. Boggs has been appointed city salesman at Philadelphia. P. G. Smith, formerly assistant to C. W. Martin, Jr., at Atlanta, has been transferred to the Akron office to assist Mr. Martin in his new duties as manager of the motor truck tire department.

A. J. ROGERS GOES WEST.

A. J. Rogers, who has been connected with the sales department of the Remy Electric Company, Anderson, Ind., makers of the Remy magnetos, has been transferred to the San Francisco branch, 170 Golden Gate avenue, in the capacity of branch manager. The new western coast manager enjoys a wide acquaintance in the automobile industry of the Middle West and South.

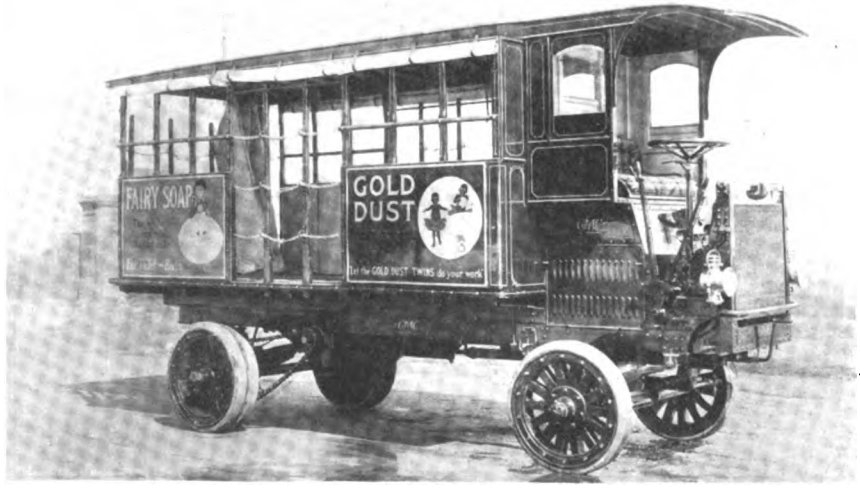
G-M-C "RUBBERNECK" BUS.

The new G-M-C sight-seeing car is the first full fore and side-door design on the market. This is claimed to be a marked advance from the old style. It is built closely along the graceful lines of the pleasure car type, and does not resemble, in the least, the ordinary "rubberneck" design.

In appearance the machine looks like an elongated touring car. The seats are so arranged as to care for 16 people. The body is mounted on a 2-ton G-M-C chassis, the wheelbase being 142 inches. The first one finished was shipped to Seattle, where it will be used in conducting parties through the famous Rainier National Park to the line of eternal snow on Mount Tacoma. This trip is considered by some to be the most marvelously scenic automobile drive on the American continent.

PIERCE-ARROW RECORDS.

A Pierce-Arrow coal truck operating in Chicago recently delivered 1,331 tons of soft coal in 30 days. Another Pierce-Arrow machine delivered 355 tons in 7 days, traveling 48.9 miles per day. The cost of delivery averaged 24.6 cents per ton. On January 12 last, with the thermometer registering 12 degrees below zero, and the streets covered with ice and snow, this machine delivered 78½ tons and traveled 75 2-5 miles during the day. The Pierce-Arrow is a 5-ton worm-drive machine.



Type of G-M-C 3½-ton truck used by N. K. Fairbanks & Co., Chicago.

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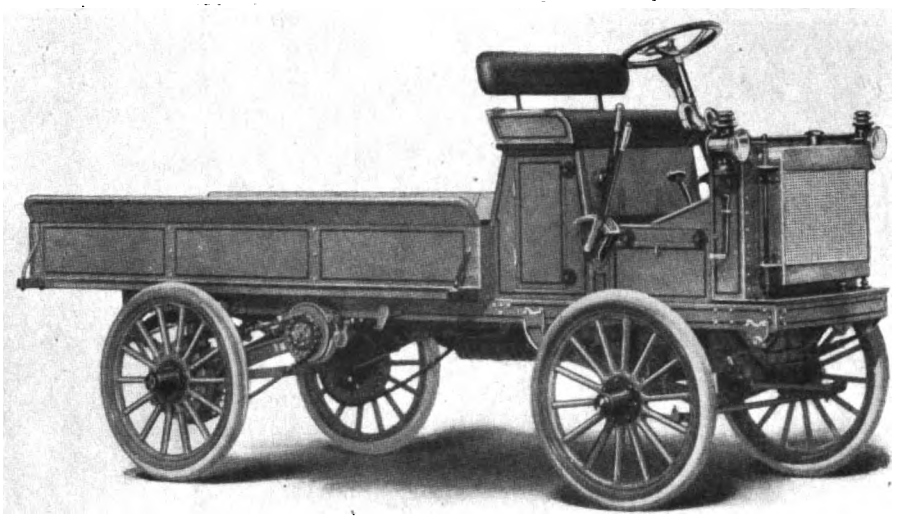


The Sanford 1-ton truck is a smart, business-like model.

THE SANFORD ONE TONNER.

The Sanford 1-ton motor wagon, made by the Sanford Motor Truck Co., 1810 to 1814 Park street, Syracuse, N. Y., is the culmination of over 9 years of specialized effort. Substantiality is assured by building the whole machine to weigh 2,500 pounds unladen, which is in keeping with the latest approved practice.

The power plant is designed on the unit plan, with 4 cylinders, 4 cycle, 4 by 4½ bore and stroke, cast in pairs. Clutch and flywheel are inclosed in an oil-tight aluminum casing. Water cooling is used, with gear-driven centrifugal pump and Mayo radiator.

The axles are extremely strong. A 2½ by 1¾ inch, forged I beam section, is used in front, fitted with Standard roller bearings.

The disk clutch comprises 16 crucible steel disks, hardened, tempered and ground, and oiled by a force feed pump.

The frame is of 4 inch channel steel, with front bumper; wheelbase, 106 inches: tread, 56 inches.

Whitney or Baldwin chains, Schebler carburetor, Hess Bright bearings in the transmission, and other standard parts testify to the general high class of the design.

The warranty completes the evidence. We quote from the company's own announcement:

"The Sanford Motor Truck Company has reason to have pride in every motor truck it manufactures. We warrant the motor trucks manufactured by us for one year after the date of shipment, this warranty being limited to the furnishing at our factory of such parts of the motor truck, as shall, under normal use and service, appear to us to have been defective in material or workmanship.

"This warranty is limited to the shipment to the purchaser without charge, except for transportation, of the parts intended to replace the part or parts claimed to have been defective, and which, upon their return to us at our factory for inspection, we shall have determined were defective, and provided the transportation charges for the parts so returned have been prepaid.

"We make no warranty whatever in respect to tires, rims, chains or accessories.

"The condition of this warranty is such that if the motor truck to which it applies is altered, or repaired outside of our factory, our liability under this warranty shall cease.

"All orders and contracts subject to strikes, accidents and causes beyond our control.

"Our guarantee ceases on any Sanford trucks on which the governor seals have been broken.

"The purchaser understands and agrees that no warranty of the motor truck is made, or authorized to be made, by the company, other than that herein above set forth."

NOVEL ADVERTISING SCHEME.

T. B. Rayl & Co., one of Detroit's hardware and sporting goods stores, have a novel scheme of advertising special goods, using a General Motors two ton truck to carry out the idea. They have made two panels about two feet wide and the length of the truck, and these they have placed at the sides of the truck. When they have anything special to announce they utilize these bulletin boards for that purpose.

Berlin celebrated All Fools' day by ordering all horse cabs off the streets of the city. Professional horse wagon operators should note the direction of the wind.

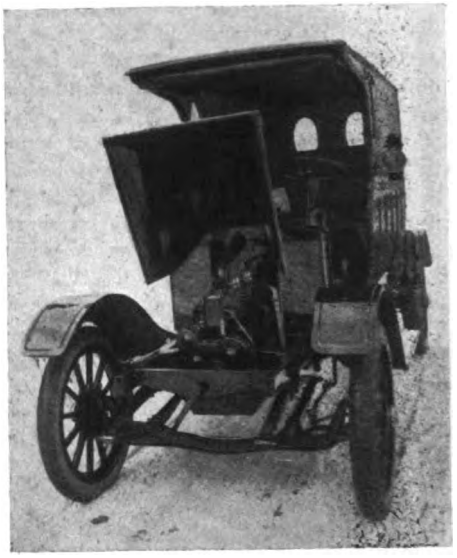
A worm-driven back axle on a 2800-pound motor wagon in London has run up to date no less than 47,000 miles, and has never even had to be examined, much less repaired.

LIPPARD-STEWART MOTOR.

A very striking feature of the Lippard-Stewart delivery car is the great ease and convenience with which the motor can be reached. The hood is so attached that when raised it completely exposes the motor from both sides and the front. The hood is held up by a small rod. This arrangement enables the driver, or mechanic, to get at any part of the motor with the greatest ease, without the necessity of leaning over the fender in cramped space underneath the bonnet.

This means a great deal in the proper care of the motor car, as it makes it easy for the driver to take the necessary care of it. Wise designers of commercial cars nowadays take into account the personal factor and make it easy for drivers to clean, oil and adjust the mechanism of their cars.

The Lippard-Stewart motor offers another advantage in that it can be easily



Accessibility to all parts of the motor is one of the many good points about the Lippard-Stewart.

and quickly removed without disturbing any other unit. The complete motor may be taken out by simply unscrewing a few bolts, which leaves it free to be slipped forward out of the frame. This ready removal of the motor would be of considerable value to any firm operating a fleet of delivery cars, where in case of any possible engine trouble, the motor can be quickly replaced by an extra one without throwing the car out of service. The removed motor can be put in shape without crippling the service in any way and be on hand for use again in a similar case.

Wurtemburg will establish motor post lines.

Alms & Doepke, who operate a big department store in Cincinnati, have purchased 9 Mack motor wagons, valued at $27,000.

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A. B. C. PERSONALS.

Francis H. Briggs, sales manager of the American Bronze Company, Berwyn, Pa., is now making a short trip through northern Pennsylvania, calling upon the wholesale hardware and automobile jobbing firms there.

Lloyd P. Jones, formerly general manager of the Atlas Ball Company, is now making a prolonged trip through the Mississippi Valley and along the Atlantic Coast, visiting automobile jobbers and wholesale hardware houses in the interest of the American Bronze Company. Mr. Jones is explaining to the trade the new features of marketing "non-gran" high speed bearing bronze in cored bars, which are now being packed in separate cartons with the size and weight stamped thereon by the American Bronze Company. Before shipment, each "non-gran" cored bar is now being sand blasted to facilitate machining.

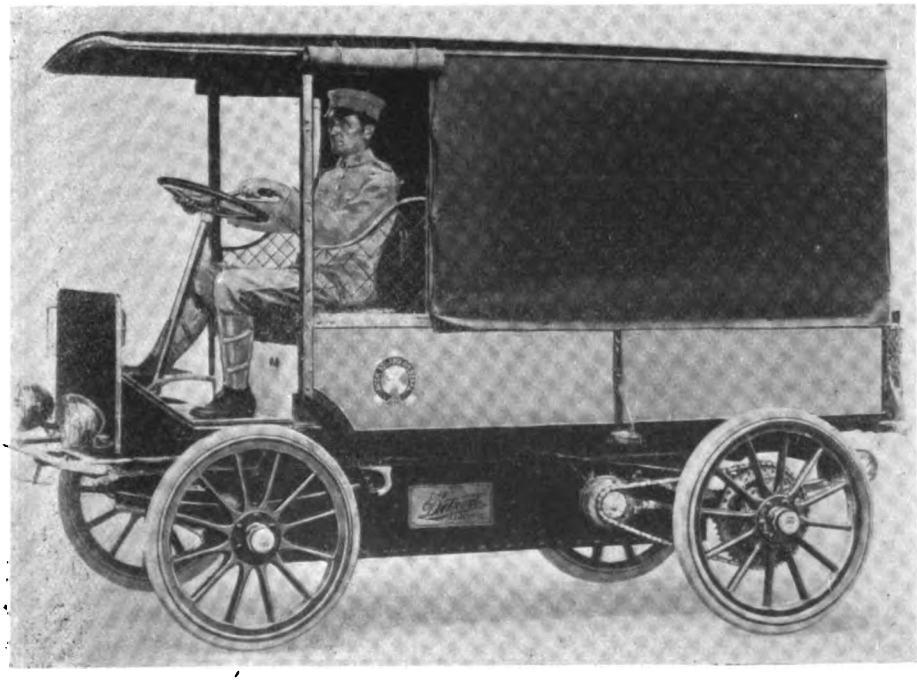
IRREPROACHABLE RECORD.

A year ago, the United States government purchased this 2,000-pound capacity "Detroit Electric" (made by the Anderson Electric Car Company) for use at the Rock Island Arsenal, which is situated in the center of the department of the Mississippi valley at Davenport, Iowa, and Rock Island, Illinois. The vehicle is equipped with a 60-cell A-6 Edison battery and has 32 by 3-inch Firestone tires in front and 34 by 3½-inch tires in the rear.

In a report just received from Rock Island, the following information is given:

"During the year which the car has been in service, it has been on the road every day and has been traveling as high as 65 miles on one charge. No trouble whatever has been experienced in getting through the snow. Every day, we make regular trips to the post office with mail and also break the roads when the snow is sometimes three, four or five feet deep in places. We have not missed a single trip during the entire year with the exception of one day when the car was sent to the garage for inspection. For the general hauling work required at the Arsenal, we find our Detroit Electric to have plenty of speed, ample mileage capacity and power."

Snowdrifts anything short of avalanches don't bother this G-M-C electric.



"Detroit electric" which made remarkable record.

"STUNT" BY ELECTRIC.

C. L. Morgan, sales manager of the Electric Division of General Motors Truck Company, recently superintended an electric truck test, which, for strenuousness, will compare favorably with any stunt accomplished by trucks of the gasoline type. During the last snow storm one of his men drove a three-ton G-M-C electric from Pontiac to Detroit in a severe blizzard, carrying a full load and running within twenty per cent of its full rated mileage. The roads were in a frightful condition, the snow drifted rapidly, piling up in some places as high as three feet, and although these difficulties were encountered, the truck made very good time, covering in all 26 miles.

SULLIVAN'S NEW WORK.

George L. Sullivan, formerly traveling sales representative, has been appointed supervisor of the Alco branch houses in Chicago, Boston and Montreal. Mr. Sullivan has been well known for years in the industry through his affiliation with various automobile companies and his newspaper connections in New York, Boston and Denver. Following two trips aggregating 25,000 miles in the South and Southwest, he recently gave valuable information on the growth in use of motor trucks in these sections of the country.

Pawtucket, R. I., has a motor combination ambulance and patrol wagon.

President Blood of the E. V. A., estimates that $10,000,000 is invested in electric power wagons in this country.

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Autocar sprinkler in service of Pensacola, Fla.

EXPRESS CO. ORDERS 20.

The Long Island Express Company is preparing to inaugurate a school for motor truck drivers among its teamsters. The company has purchased 20 Alco trucks of 3½ tons capacity in less than a year. In another year or two this service will be almost entirely motorized. A picture showing some of these machines appears in the first article in this issue.

"Instead of employing chauffeurs to operate our motor trucks, we are training our regular drivers," said Mr. Payne, who is in charge of the company's force of operators. "This is more practical, because the men who have driven our horses are familiar with express problems, the handling of merchandise, loading, unloading, shipping terminals, etc. The actual operation and care can be learned in a short time.

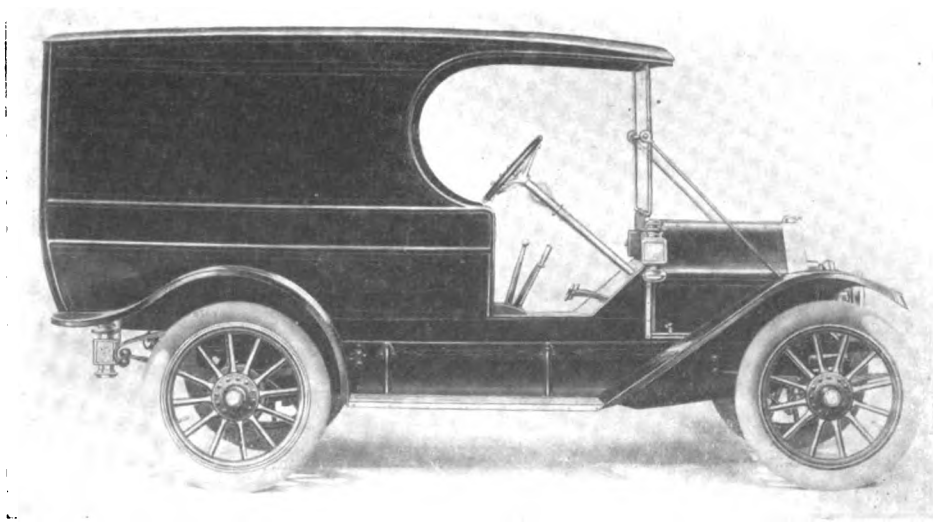
"We are rapidly transforming our stables on Long Island into a garage, and service shops will be equipped to take care of the trucks.

"In my experience with motor vehicles there is no comparison between these and horses. The cost of operation of the trucks is much lower and the service is infinitely better. For instance, every winter our horse deliveries have at times been crippled, and it has been necessary to send out and rescue the horses in severe weather.

"In the summer the horses again suffer from the heat. During the hot spells last year we saved the lives of at least 40 of our horses by keeping them in the stables and using our trucks 24 hours a day.

"As for comparative years of usefulness, we have retained our horses in service two years and sometimes as many as three years. In certain lines of industry the life of a horse is longer, but express service is known to be more severe than almost any other type.

"A good motor truck may do the work of four generations of a horse, while proving practically no expense except the cost of operation."



New Overland Model 59D "Special" Van; inside measurements, 60 inches long, 43 wide, 50 high. Another new Overland model is the 59D "Express."

CHASE MOTOR TRUCK CO.

At the last meeting of the stockholders of the Chase Motor Truck Company of Syracuse, N. Y., it was voted to double the capital stock, making the capitalization $300,000 instead of $150,000, as it has been for some time past. This increase is in line with general development of manufacturing facilities which have been going on in the company for the past four months. Judged by the amount of business done last year and the orders that have been coming in for the last few months, it was thought that the capitalization of the company bore too small a proportion to the scope of business. The company reports good business conditions in all sections of the country, particularly in the middle west and the northwest, where the demand for Chase trucks has been constantly increasing ever since the first of the year. For some time past the Chase Motor Truck Company has been planning extensive additions to its present manufacturing facilities, but is not prepared as yet to more than outline what these will be. The new factory addition in Wyoming street, completed the first of the year, was very early found inadequate to take care of the advanced volume of business. It is expected that the plans under way at the present moment, if carried out, will be sufficient for some time to come.

FINE PROGRESS BY CHASE.

The Chase Motor Truck Company reports a record business for the month of March. Numerous repeat orders have been received and the outlook for the spring business, judged by actual orders in hand, is even better than was anticipated. Early in the month the Chase dealers in Minneapolis, Minn.—the Chase Motor Truck Sales Company—placed an order for 62 Chase trucks of which 6 were going as soon as delivered to the Dakota Central Telephone Company, of Aberdeen, S. D.

Among other good orders were those of the H. L. Keats Auto Company, of Portland, Ore., for 9 trucks; the Intermountain Auto Truck Company, of Butte, Montana, for 6 trucks, while another nice order was that from the city of Seattle for 5 Model D and K expresses.

One of the latest orders was from Abraham Strauss Company, the big New York department store, which has purchased a Model K special. Among other large New York department stores using the Chase are R. H. Macy & Company and Stern Bros.

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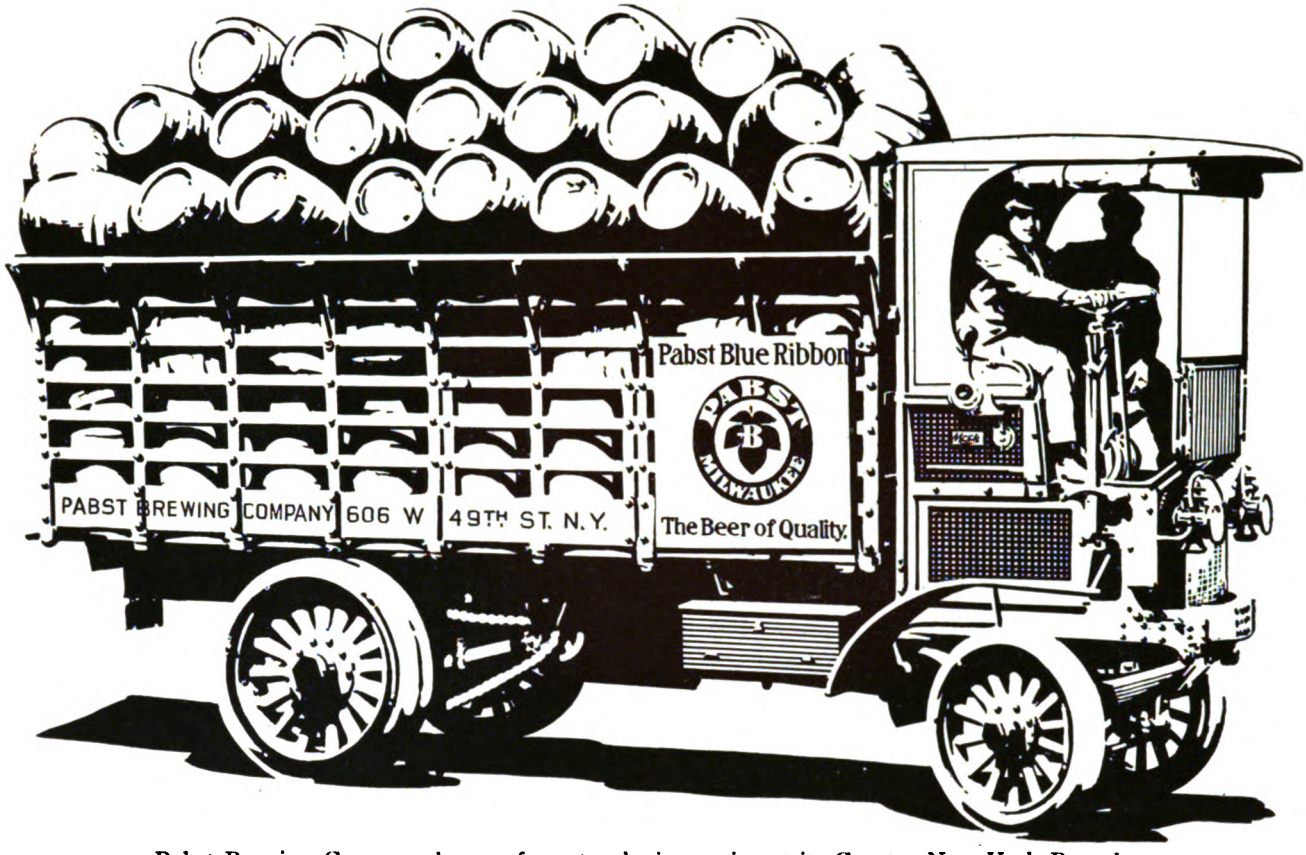

Pabst Brewing Company has 4 of our trucks in service at its Greater New York Branches

Mack Proved by 12 years of real service **Saurer** Proved by 17 years of real service **Hewitt** Proved by 10 years of real service

"Leading gasoline trucks of the world"

"Service"

A motor-truck manufacturer can give four kinds of service to a business-man who comes to him for advice on transportation problems:

1—Long Life: He can sell him a truck that has proved profitable long life by years of consistent good service.

2—Right Sizes: He can help him choose the right size of truck and style of body for each different requirement of his business.

3—Operating Instruction: He can instruct the man, who is going to run the truck, how to operate it most economically and how to give it every day care.

4—Keeping in Order: He can provide "service stations" where the owner will be sure of getting materials and workmanship of factory standard, with the same personal attention, after he has bought his truck as when he was only a "prospect".

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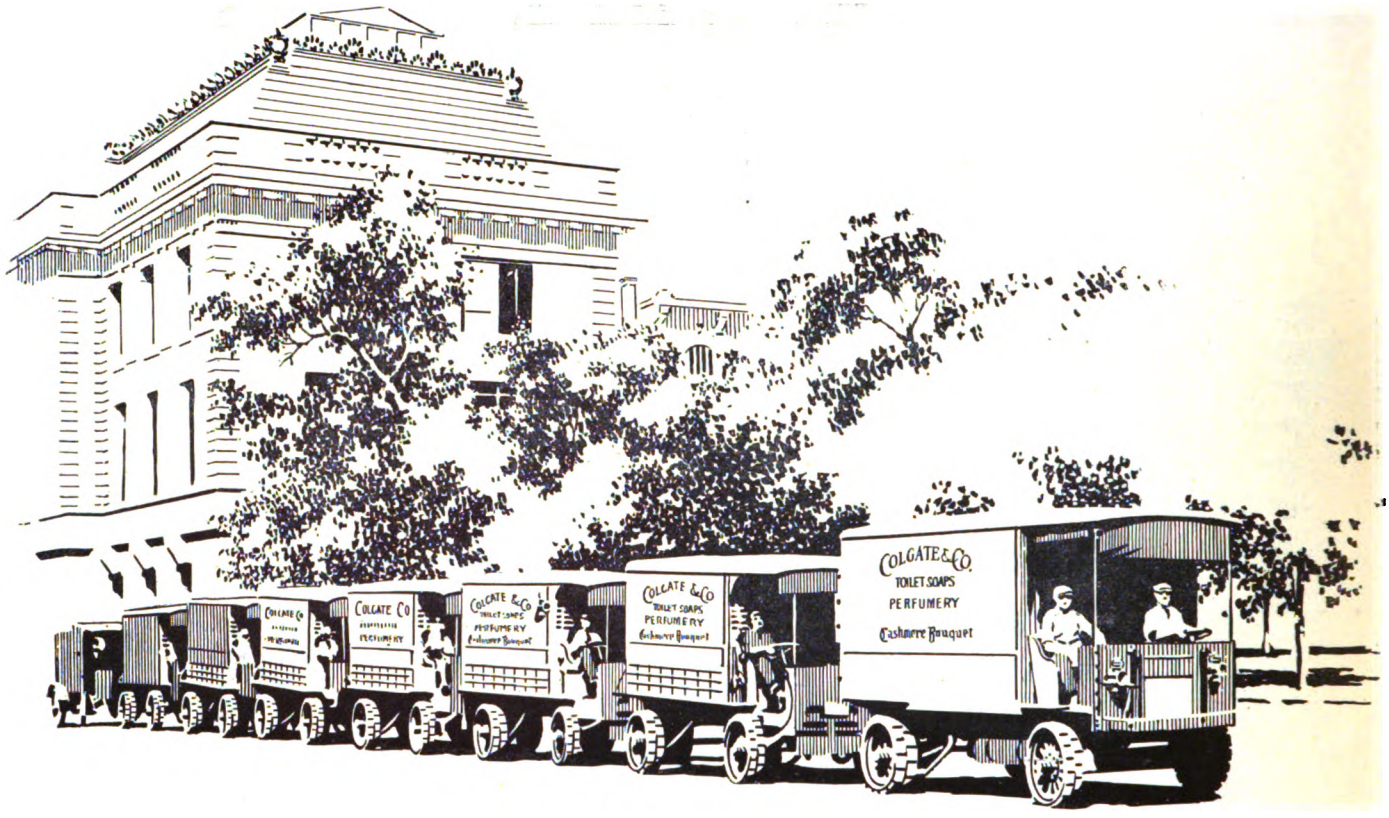

This picture represents part of a fleet of 21 of of our trucks of various sizes from 1 to

Most manufacturers can't give this service — not the important parts of it. Their trucks have neither the years of service back of them, nor the variety of sizes and styles.

International Service

The International Motor Company can give this service because it started without patents to capitalize or experiments to exploit. It was free to provide whatever was necessary for good transportation.

This company takes the point of view of the man who is looking for the best possible truck outfit for his business. It deals with his problem independently, supplying the expert study and technical knowledge for which he has neither the time, the facilities, nor the training. And it has the right equipment for any need, and the financial strength necessary to keep the equipment in proper condition.

1 — Long Life

This company's trucks have the longest records of profitable usefulness of all trucks in the world (Macks, 12 years; Saurers, 17 years; Hewitts, 10 years). In fact they are the only trucks that have been in regular commercial service long enough to give positive proof of investment value.

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7½ tons in the service of Colgate & Co in Greater New York and Jersey City

That is why the company chose them. For long life means slow wear, which means low maintenance-cost and uninterrupted sure service—an important consideration to every business-man.

2—Right Size

The importance of a truck being exactly the right size and type for its special use is not always realized. Most manufacturers have only one type and one or two sizes, and try to make those appear suitable for everything. But it is evident that an overloaded truck wears out rapidly, while one, that is not used up to its capacity, wastes power and is therefore extravagant.

The International Motor Company builds a size of truck for each load requirement, with several methods of load-distribution. Capacities: 1, 1½, 2, 3, 4, 4½, 5, 6½, 7½, and 10 tons.

It builds from its own designs and in its own plant, standard bodies for every usual use. Also, it specially designs and builds the best body for any unusual service.

3—Operating Instruction

A motor-truck must work well in inexpert hands. Regular attention by a man competent to make minor adjustments to meet the stresses of constant use, minimizes wear, insures regularity of running, and prolongs the life of the truck.

This company instructs men who are going to run its trucks, not only in the safe and economical operation, but in the daily care.

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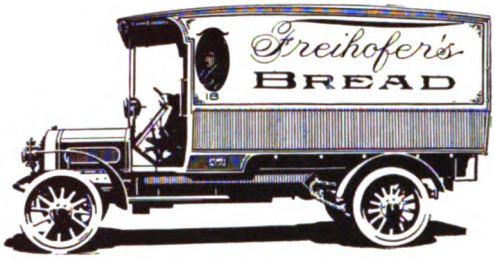
Mack Proved by 12 years of real service Saurer Proved by 17 years of real service Hewitt Proved by 10 years of real service

"Leading gasoline trucks of the world"

4—Keeping in Order

The "service" which a truck must render is *built into* Macks, Saurers, and Hewitts to start with. Design, materials, and workmanship, keep these trucks out of the repair shop.

To give the maintenance-attention which all machinery occasionally demands, the International Company has service stations in the large centers and others are being added. These stations are equipped to do work fully up to factory standards.



The Freihofer Vienna Baking Co., one of the largest bakers in the country, uses 11 of our trucks at its Philadelphia branch. Repeat orders are constantly being received.

The full facilities of the Engineering Department, the factories and the general offices are behind every representative of the company, and, through him, are available to everybody interested in economical transportation.

To Dealers

The company is adding to its list dealers whose position enables them to carry out its broad policies. To the right men is offered the best opportunity in the motor-vehicle field to-day.

Business-men, write for our literature.
Dealers, write for our proposition.

International Motor Company

General Offices
57th and Broadway New York

Works
Allentown Pa; Plainfield N J

Sales and Service Stations
New York, Chicago, Philadelphia, Boston, Cleveland, Cincinnati, Buffalo, Baltimore
Jersey City, St Louis, Atlanta, Kansas City, Denver, San Francisco
Los Angeles, and other large cities

Part of a fleet of 20 of our 3- to 10-ton trucks in the service of Burns Bro., New York City

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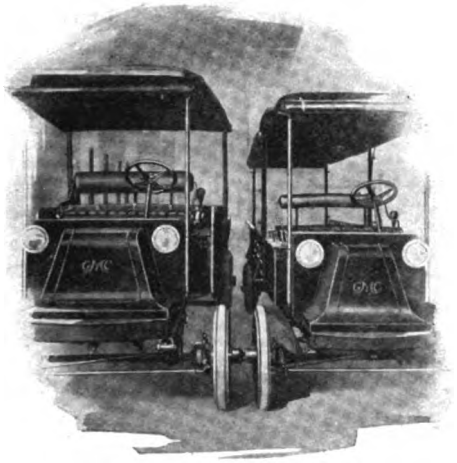

Two of the new G-M-C electric wagon models

Safety switch, ampere-hour meter and lamp circuits are all accessible.

Lifting the hood exposes all parts of the controller, etc.

G.-M.-C. ELECTRIC WAGONS.

There has been no design of electric trucks that has been more generally discussed during the last month or two at the various automobile shows than John Lansden's latest production, the G.-M.-C. electrics.

There certainly is no feature of this truck which has been given greater prominence by the General Motors Truck Company's selling force than its wonderful accessibility for inspection and care. This has been very forcibly presented in a post card recently issued.

The illustrations herewith show the advantages of the exclusive features of this design; the controller, safety switch, ampere-hour meter, lamp circuits are all instantly accessible by raising the hood, which is conventional in design and construction, adding greatly to the appearance of the chassis, and amply protected by the heavy oak bumper substantially ironed. This location alone means a great deal to the garage man because the controller has been so placed that adjustment and inspection of each and every finger is readily made. All connections are in plain sight and are not unhandy to the caretaker.

The feature most radical and most commented on is the battery on top of the frame under the driver's seat. This eliminates absolutely the usual labor of disconnecting and withdrawing batteries, saving on all large sized machines several hours weekly, and removing all possibility of accident by the dropping of battery crates or short circuiting due to hanging leads, etc. Furthermore, as the battery is in plain sight, the caretaker does not have to work through a trap door or around corners to get at the cells.

Every battery manufacturer is naturally enthusiastic, for this means that this product, for which he is at least morally responsible, is now given the very best possible chance for care; not only is upkeep and inspection made easy, but the battery is free from the usual dirt and drip from anything carried in the body proper. It is also properly ventilated as well as protected against excessive chilling.

It is contended by some that such a design introduces too great a length to the machines, but it is a generally accepted fact that in gasoline trucks (of the smaller load capacities, at least) the foreign practice of placing the engine under the hood is correct, and what the American buyer demands.

It follows, therefore, that as these machines are invariably longer than the G.-M.-C. electric, that this question of length is superficial at best. Certainly the old gasoline truck with the engine located under the body proper no longer has a position in the market. It is too difficult to give it the proper care and attention and Lansden's ten years of experience has taught him that everything that can be done to facilitate both inspection and care is progress.

The main question with every operator is not necessarily the over-all length of his truck, for certainly the circle within which the wheels will turn is of most importance, and on account of the G.-M.-C. narrow frame, this is kept at an absolute minimum, their turning circles being entirely favorable for equal loading spaces. Moreover, there is not one driver in twenty who will not use the battery box cover as loading space.

The General Motors Truck Company report orders in quantity from some of the largest and oldest users of electrics, which may properly be considered as a general and public indorsement and appreciation of their design.

No cranking necessary. You can start as you get in, if you like.

Shows accessibility of battery.

G-M-C BUSINESS GOOD.

General Motor Truck business increased 200 per cent. during the month of March, and from all indications April will eclipse that record, for, on a single day this month, orders were received for 12 G-M-C trucks. The orders came from different parts of the country, showing that the demand is general. They were for immediate delivery.

LAYCOCK WITH SHELDON.

A. M. Laycock has been engaged as chief engineer of the Auto Axle Department of the Sheldon Axle Company. Mr. Laycock was formerly employed by the English Daimler Company, as designer. He has for the past several years been chief engineer of the A. O. Smith Company, of Milwaukee, Wis.

The Federal Motor Truck Company has received from Gary, Ind., an order for 15 motor buses.

Jas. A. Hearn & Son, of New York City, have ordered a fleet of fifteen 1000-pound "Detroit Electric" delivery wagons from the Anderson Electric Car Company.

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NEW INDUCTOR MAGNETO.

I. J. Reuter is an acknowledged authority on the inductor type of magneto, which is the key to the success of the Remy Electric Company in the ignition field. Since the sale of the Remy Electric Company a little more than a year ago, Mr. Reuter has associated himself with this concern as chief engineer, and has developed and perfected the inductor type of magneto. Mr. Reuter succeeded B. Perry Remy, who was president and engineer of the Remy Electric Company previous to the sale.

The new RD type of inductor magneto that has just recently been brought out by the Remy Electric Company is the product of Mr. Reuter's genius. He has in many ways improved the product of the Remy Electric Company, among the refinements being the substitution of "Bakelite" for hard rubber. "Bakelite" is a synthetic insulator that is far superior to hard rubber in that it will not burn when flame is applied. He has also refined the design of the magneto and improved it in many ways, making it smaller and more compact without reducing its efficiency.

Another improvement is the substitution of ball bearings in the new type RD magneto. One of his latest achievements is the new vibrator coil especially adapted to self-starting devices. It produces a shower of sparks in the cylinder instead of a single spark.

Mr. Reuter was at one time designing engineer of the Willys-Overland Automobile Company. He graduated from Purdue University in 1906 and is a member of the Society of Automobile Engineers.

AGAINST SPEEDING.

That distinctly revolutionary type of hilarious individual known as the speed maniac, who became particularly progressive with the advent of the automobile, now looms up as a special menace to the motor truck industry.

Experts, interested in the power wagon because of its economic possibilities, declare that the driver who throws reason to the wind in the operation of a truck and hits up too fast a pace, is unquestionably the most expensive feature of truck maintenance.

Commenting on this fact F. F. Phillips, manager of the solid tire department of the United States Tire Company, says:

"Beyond any question of doubt the speed maniac is a menace to the truck industry. Putting aside every other consideration—wear and tear on machinery, endangering the lives of pedestrians and violation of sane traffic rules—the speeder is an undesirable party for the reason that he costs his employer a great deal of unnecessary money.

"It makes no difference how well solid tires are made, or to what extremes the manufacturer goes to fortify them against the incessant knocks of road travel, they will not withstand the abuses of the speed maniac. Speeding is an evil that can result in but one thing—decreased tire mileage and increased tire expense. And the particularly aggravating feature of this is that it is a matter that cannot be regulated unless a driver obeys instructions and sends the truck along at a moderate pace. Reliable drivers do this, but there is always the other fellow, who, as soon as he is out of sight of the boss, throws open the throttle and burns up the pavement. Such a man is decidedly expensive to the truck owner.

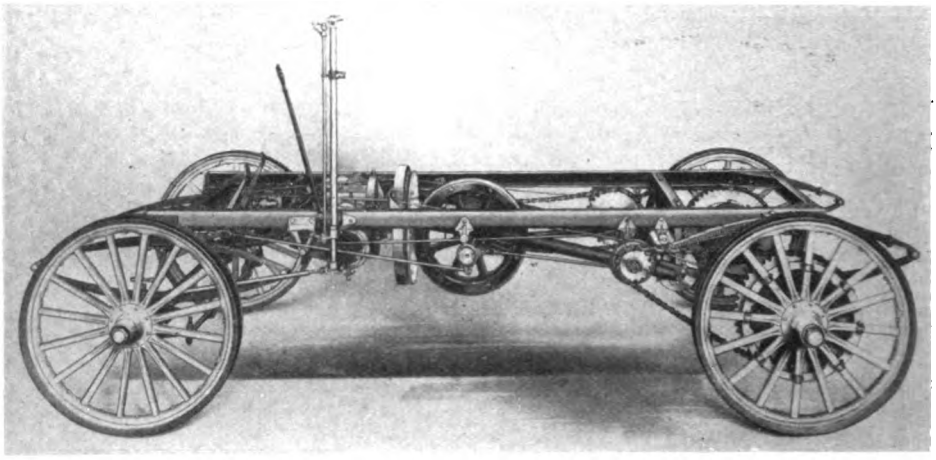
"Demonstration has proved that at an average speed of 12 miles an hour the life of a tire is about twice what it is at an average speed of 20 miles an hour. Still higher speeds reduce the life of the tire proportionately. Therefore it should not require any great amount of meditation to determine the effect of constant speeding upon an owner's tire bills.

"There are a great many conditions and abuses calculated to shorten the life of a solid tire, but of all these I have no hesitancy in placing speeding at the top list. Every manager of a motor service should insist upon strict observance of moderate speeds. Economical tire service cannot be secured in any other way."

LAKE WITH PERFECTION.

E. F. Lake has been placed in charge of the laboratory of the Perfection Spring Company, of Cleveland, Ohio. Mr. Lake has recently been conducting a consulting metallurgical business and was formerly steel editor of the "American Machinist."

Adolph Saurer, Arbon, Switzerland, advises that the Arbon and Suresnes (France) factories are producing 65 machines a month. Over 400 Saurers are on order from these two plants, including 125 for the Russian government.



Side view of the Lincoln chassis.

LINCOLN MOTOR WAGON.

During the recent automobile show in Baltimore, the "News" of that city published the following item:

"Motor truck test proves successful. To demonstrate the efficiency of being able to handle a loaded truck under all conditions, a pulling exhibition was held at Glenburnie, Anne Arundel county, by the local representatives of the Lincoln light motor wagon.

"The Lincoln 800 pound wagon carrying nine persons, or over 1,200 pounds, was buried in the sand up to the axles and pulled out with comparatively little effort.

"A fairly good sized crowd went from Baltimore to Glenburnie to witness the test, some going in automobiles and others on the Annapolis Short Line. J. E. Norwood of Norwood Bros. was in charge of the test and says that everything went off as he expected. A number of merchants and business men who contemplate purchasing trucks and who are interested in the workings of trucks generally went to Glenburnie for the motor test. Mr. Norwood, in speaking of the test, said: 'I was greatly disappointed because there were present but few motor truck dealers and representatives at the test. I asked a score or more of them to be present and a few did go down to witness the exhibition. I notified many of the dealers to bring their trucks and go into the test, but none took me up. A few dealers were present. I believe that sand is about the worst condition that a motor truck will meet in this part of the country and for that reason selected the sand of Anne Arundel county for the test.'"

The Lincoln motor wagon mentioned in this test is a sister machine to the one that won the silver cup in Division 2-K (501 to 1,000 pounds) in the Chicago to Detroit and return, reliability run held in August, 1911, under the auspices of the Chicago "American."

These indorsements are sufficient introduction to the machine itself.

The Lincoln wagon is made in three

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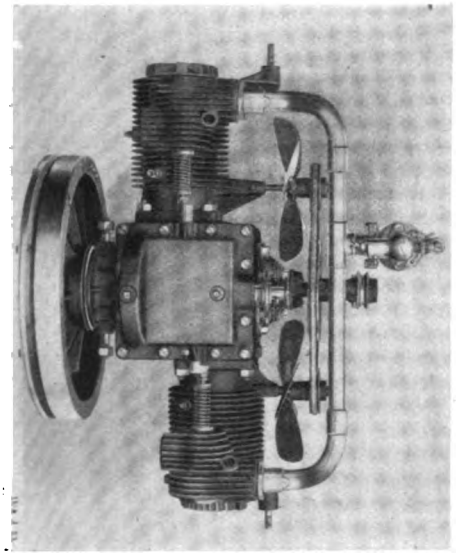
types: Model 29, open body with flare boards (5 feet long behind seat, 37 inches wide, 10 inches high), capacity 800 pounds. Model 27, panel body (54 inches long behind seat, 40 inches wide, 55 inches high), capacity 800 pounds. Model 28, open body with flare boards (5 feet by 37 inches by 8 inches), capacity 600 pounds.

The general specifications of these are very similar. Ignition is by jump spark with multiple battery and non-vibrating coil. Friction disk transmission is used; pressed steel, channel section frame, thoroughly riveted and reinforced with gusset plates; double side chain drive from jack shaft; wheel base 87 inches, tread 56 inches; four full elliptic springs; spark and throttle levers on top of steering post. Tires are 32 by 2 inch cushion in all models, or optional 34 by 3½ inch pneumatic in the first two.

The Lincoln company takes especial pride in its motor. We quote from a recent communication:



The Lincoln people are very proud of this simple, efficient motor.

"We have given a great deal of thought and care to the construction of this motor, wishing to get away as far as possible from all complications, realizing that a motor, to be used for commercial purposes and to be taken care of in a great many instances by an inexperienced person, must be simple in order to have it give service. We have also borne in mind the necessity of an occasional overhauling or an occasional cleaning out of the carbon, and the construction of our motor differs from the conventional two-cylinder, air cooled motor in this way:

"Our cylinders are not only bolted to our crankcase, which allows a removal for working convenience, but our cylinder heads are also removable. Our construction here avoids the use of gaskets, which have been a source of trouble to more or less extent in the cylinder head. The cylinder heads of this engine screw in, and fit perfectly on a bevel seat, which is ground the same as a valve. This enables us to avoid all leakage of compression, and it further enables us to remove the cylinder heads for cleaning out carbon without disassembling the entire power plant. Both cylinders are very carefully ground.

"Our main bearings are adjustable, and are made of a special babbitt. Our crankshaft is drop-forged and heat-treated, and all bearing surfaces accurately ground. The connecting rod bearings are of special babbitt, and the connecting rods themselves are drop-forged and heat-treated. The wristpin bearing is of bronze. The connecting-rod bearings are adjustable in that they are provided with shims to allow the taking up of wear.

"Our pistons are of a very high grade of cast iron, annealed and carefully ground, and the piston rings, of which there are three in number, are ground and have a lap joint.

"There is one camshaft, hardened and ground, located on the top of the crankcase, and the cams are integral with the camshaft.

"The timer is of our own special design, and is mounted on the end of the camshaft.

"The valve plungers or push rods are hardened and ground, and are provided with adjusting screws to take up the wear on the valves.

"The inlet valves are the automatic type, while the exhaust valves are mechanical, with a nickel steel head and carbon steel stem.

"The crankcase is supplied with a breather, and its purpose is to relieve crankcase compression. It is so constructed that no oil can blow out through it.

"A large ball thrust bearing is placed between the flywheel and the crankcase, to take up the end thrust when the friction surfaces are brought into contact.

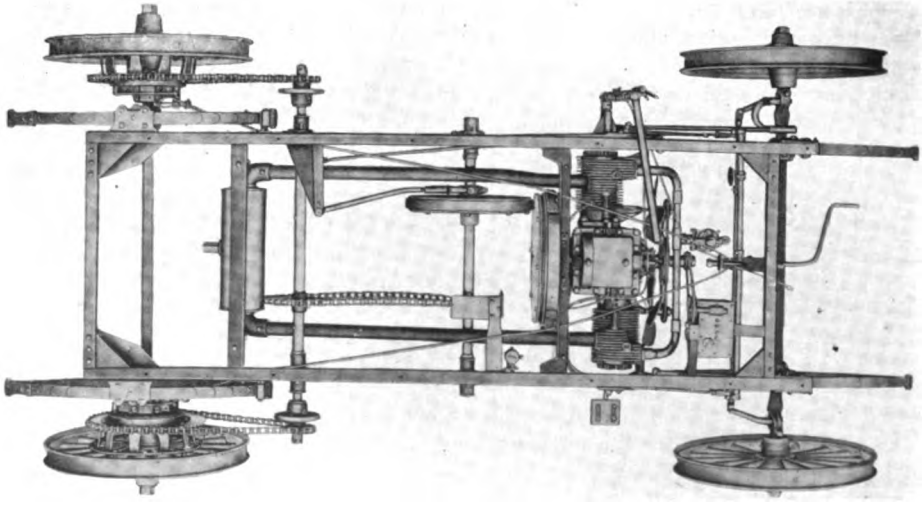
Lincoln motor wagon, loaded with 9 people, pulling itself out of sand in which it was buried to the hubs.

"The jackshaft which carries the differential is so constructed that the differential practically locks in a hard pull when one wheel is getting greater traction than the other. This is right in line with the present up-to-date construction of truck differentials. Axle bearings are Timken rollers."

WILKINSON MOTOR STARTER.

The Wilkinson Motor Starter Co., Detroit, Mich., has elected the following officers: Fred Stevenson, president; Benson E. Brown, vice-president and general manager; R. W. Wagar, secretary and treasurer. The company is capitalized with $50,000, and will market a mechanical starter made under the Wilkinson patents. It starts the motor by revolving the flywheel, the necessary impetus being given by pressure on a dash pedal. It is said that three Michigan car manufacturers are having it attached to their cars, with a view to adopting it as standard equipment for 1913.

During the first three months of this year over 50 motor wagons exceeding 1 ton in load capacity have been sold in St. Louis.



Plan of the Lincoln chassis.

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TRANSPORTATION PROBLEMS.

By R. W. HUTCHINSON, JR.

There are two ways of doing the power wagon business. One way is to build one or two sizes from a single design and then try to sell as many as possible by making those sizes do for every purpose, regardless of what real efficiency and economical service would require. The other way is: (1) Make a thorough study of transportation problems; (2) find out what designs and sizes will best meet each different need; (3) build those designs and sizes with every wanted style of body; (4) apply exactly the right machine in each case.

The scientific solution of transportation problems is what the International Motor Company is organized to provide. It chose the big and broad field of transportation rather than the restricted field of merchandising a particular machine. It studied the transportation problems of all the different lines of business. It provided the power wagons needed to solve those problems.

A real understanding of the individual problem is essential to both economy and efficiency. It calls for a great fund of information about the transportation side of the business under consideration; knowledge of actual experience in that line of business with all kinds of equipment, horse-drawn and power-driven.

Lack of this knowledge is costly alike to dealers and to users. Much money has been lost by buying equipment that was wrong; some by refusing to buy any equipment at all, where the right motor equipment would save thousands of dollars a year. Unsatisfactory service given by wrong equipment no doubt has prejudiced some business men to whom real motor wagon service would be extremely profitable.

The engineering department of the International Motor Company has collected data on practically every use of power wagons. This information is at the disposal of every business man, either for determining the possibilities of motor transportation for his business, or for picking out the right kind of motor equipment. It is sent on request by the engineering department in New York, or by any representative of the company, anywhere.

Length of profitable service is a proof of motor wagon value. So the International Company has acquired the manufacture of machines which have been in practical commercial service long enough to prove themselves to be money-making investments for their owners.

Mack power wagons are claimed to be the oldest successful American motor trucks. They have been in use 12 years. The first Mack ever built is still actively employed every day, in Tucson, Arizona.

Saurer trucks, originally built in Europe, are the oldest successful motor wagons anywhere. Employed for commercial purposes for 17 years, they have a most remarkable record. They have taken 53 first prizes in ten contests conducted by European governments and automobile clubs—first prize in every event entered and first in every contest as a whole. Privately-owned Saurers are subsidized as auxiliary war equipment by both France and Germany and are used in postal and other government service in several countries.

In all these 17 years of service, no Saurer machine has ever worn out. It has never been necessary to replace a Saurer engine except by reason of damage by collision. The first Saurer built is still in daily use in the Alpine town of Arbon, Switzerland.

For long life as well as economy of operation, a motor wagon must be suited in size to the duty it performs. A truck intended for light loads is soon worn out by heavy loads. A machine of large load capacity wastes power, loses time, and is extravagant in every way for light load work.

Mack and Saurer trucks are built in sizes giving this range of load capacities: 1, 1½, 2, 3, 4, 5, 6½, 7½ and 10 tons. This gives a correct size for every different kind of service, from light delivery to the heaviest haulage.

Convenience and rapidity of loading, unloading and delivery and safety of transport, require bodies designed specially for each different sort of use too. The International Motor Company therefore has its own body plant where it builds all the standard types of bodies and can design and construct special bodies for any unusual need. This makes complete the variety of equipment which the company provides for giving efficient, economical transportation in all branches; it provides any style of body for any size of load carrier.

The company has already established its own service station in all large centers. There, owners of its trucks find materials and workmanship of factory standard, and the personal interest which every representative of the company has in maintaining its product at the highest point of efficiency. Other service stations are being opened.

In establishing its agencies the International Motor Company selects dealers whose standing and connections will properly represent the company's high standards in every detail of transactions. It secures such representatives by offering them all the advantages for doing business that its own headquarters possesses, and by putting behind them all its financial strength, its engineering skill and its reputation.

Two-cylinder taxicabs in London are running 30 miles to the gallon of gasoline.

OIL BY THE BARREL.

A man who operates an automobile can save money buying his oil by the barrel instead of by the half gallon and the gallon can. He may want a can to carry in his tool box for convenience, but it is economical to buy in large amounts. A neat saving in the cost per gallon can be effected, which amounts to dollars in barrel quantities.

Any motorist can well afford to buy this way because of the fact that oil does not deteriorate. A barrel may last some men a considerable time, but the last drop of a barrel of oil is just as good as the first. Barrels or half barrels can be purchased anywhere. The delivery is easy and the storage does not require much space. It is convenient to have oil always in the garage.

Automobilists, dealers say, are coming to realize this more and more and state that their barrel trade is far in excess of what it has been in past years.

The Standard Oil Company, makers of Polarine motor oil, is putting out enormous quantities of this oil in barrels. The best motor oils in barrels can be purchased for almost as little as poorer grades in cans. Good oil is a vital necessity in a motor. Figuring the cost on the basis of the wear in the motor, the dearest oil is probably the cheapest in reality. At any rate, it is the most likely to be the best protection for the cylinders.

A well oiled, well handled car may be used several seasons and still bring a good price in exchange. In fact, the additional price a well oiled car brings often more than pays for the better oil. Oil often has as much to do with the durability of an automobile as materials used in its construction. The best advice is "Buy good oil and buy it by the barrel." It doesn't cost much that way and it's good insurance.

BRYANT WITH S. W. CO.

R. S. Bryant has been appointed consulting engineer to the Standard Welding Company, Cleveland, Ohio, makers of seamless tube products and specialists in electric welding. Mr. Bryant's long experience in the design and manufacture of automobile rims peculiarly fits him to assist the Standard Welding Company in carrying out its policy of constantly improving its product and its service to customers.

ANOTHER TIRE RECORD.

In Philadelphia there is a set of Polack tires on a 4½-ton Saurer which ran over 10,000 miles between August 2, 1911, and April 6, 1912, in the hardest kind of service. The tires are still in good condition and are capable of running a few more thousands of miles.

Stockholm has electric mail motors.

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THE CHAIN LINEOMETER.

An Instrument for Determining Chain Lengths.

In a chain drive, the usual method of determining the chain length when the pitch, P, the center distance, D, and the number of teeth, N and n, on the two sprockets are known is as follows:

(1) Find the pitch radii, R and r, of the two sprockets by reference to the tables of sprocket dimensions.

(2) Find the angle d from the formula

$$\text{Sin } d = \frac{R-r}{d}$$

(3) Chain length =

$$PN\frac{(90° + d)}{180} + Pn\frac{(90° - d)}{180} + 2D \cos d$$

Where this operation has to be repeated many times a day, the time consumed is considerable. We illustrate herewith (Fig. 1) an instrument designed and used by the Diamond Chain & Mfg. Co., Indianapolis, Ind., by which chain lengths can be quickly determined by making three simple adjustments.

The instrument in its simplest and cheapest form is shown in Fig. 2, where the parts are made of paper. The fixed scale C is laid off in half-inch divisions, each representing a distance equal to the pitch of the chain. On the movable scale E, each half-inch division represents a distance equal to two pitches—one for the upper half of the chain and one for the lower half. The circles on the sectors A and B are the pitch circles of 1 inch pitch sprockets drawn half size. Points on the spirals are found by stepping off ½ inch chords on each of the pitch circles beginning at the horizontal radius to the left of G and to the right of F. Through all points one step removed from the horizontal radius, a curve is drawn and marked No. 2. Through all points two steps removed, a curve is drawn and marked No. 4, and so on. The number of any spiral represents the number of chain links from the point where it crosses a given circle to the corresponding point on the lower half of the circle.

As an example in the use of the instrument, let the distance between the sprocket centers be 15 inches, the pitch ¾ inches and the number of teeth on the large and small sprockets 72 and 36, respectively. Divide the center distance by the pitch. The result is 20, which is the center distance in terms of the pitch. Set the sector A at this figure on the scale C.

Now find the pitch circles on A and B corresponding to 36 and 72 teeth, respectively. Place the straightedge E approximately tangent to these two pitch circles, and, noting the points where the spirals cross these pitch circles, shift the straightedge E so that it covers all but one of these points. See that the zero point on the scale coincides with the point not covered on the left hand dial, and that the point not covered on the right hand dial just touches the straightedge.

In other words, place the straightedge in the position that the center line of the chain would occupy in passing from one sprocket to the other.

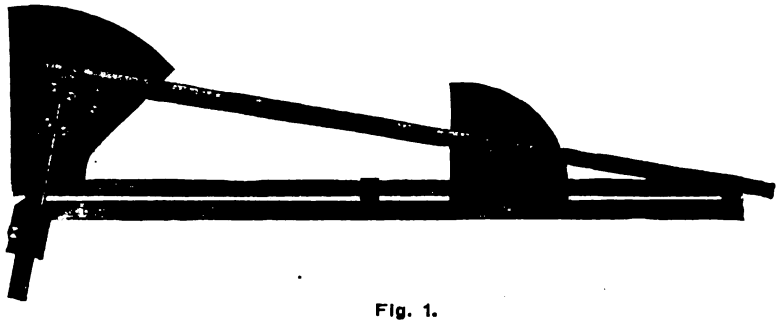

Fig. 1.

Take the straightedge reading, 38, which is twice the number of links in the span of free chain. The number marked on the spiral passing through the zero point is 44. The number marked on the spiral passing through the right hand reading is 14. The sum of these three numbers is 96, which is the chain length in terms of the pitch: 96 x ¾ inch = 72 inches, which is the chain length.

As the length of a roller chain must in general be a multiple of twice the pitch, the reading on the straightedge E must be an even number. If then the spiral does not pass exactly through one of the even numbered scale divisions, the next higher even number must be used. If an offset connecting link is used, this number must be odd. If the chain is of the "block" type, the reading may be either even or odd, since the chain length can be any multiple of the pitch.

In the steel instrument shown in Fig. 1, the adjustments are greatly facilitated. The right hand sector is quickly clamped in position by a thumb screw, H; the zero point of the straightedge is brought to the proper pitch circle by the slide J, which is graduated on the left for roller chains and on the right for block and twin roller chains. The linkwork at K allows the straightedge to swing about its zero point, while the latter is open to view.

If it is desired to determine a center distance such that there will be no "slack" in the chain, shift the right hand sector A until one of the regular divisions of the straightedge is on a spiral. Then take the center distance reading and multiply by the pitch. To determine this distance by calculation would be a long and laborious task.

To find the length of a belt a special set of sectors must be used. Set the dial plate A to the exact center distance. Set the zero point of the straightedge on the pulley circle whose diameter is marked on the dial plate itself. Place the straightedge exactly tangent to the two pulley circles, and take the exact scale reading from one point of contact to the other. If either point of contact is not on one of the spirals, take the number of the spiral that would pass through the point, if it were drawn. This can be readily estimated by the eye. If the given center distance or pulley diameters are not found on the instrument, determine the belt length for half the center distance and half the pulley diameters and then multiply the results by two.

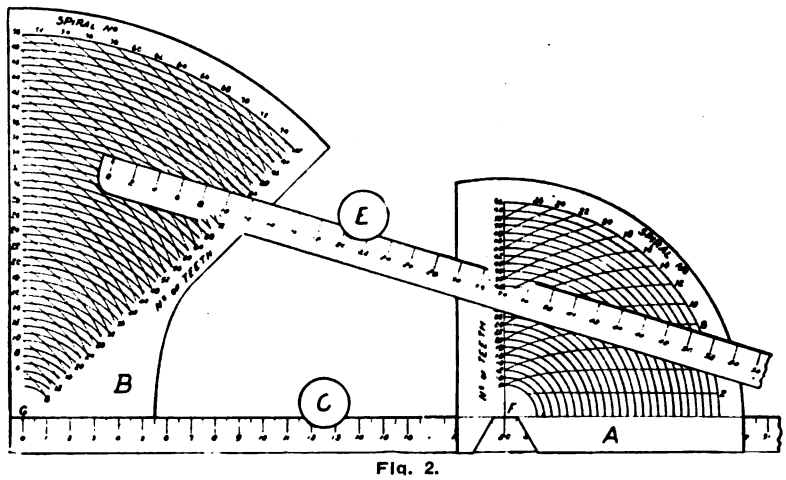

Fig. 2.

To find the length of a crossed belt, proceed as though the diameter of the left hand pulley were equal to the sum of the two diameters, and the diameter of the right hand pulley were equal to zero.

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GOOD WORK BY A MACK.

The Bell Telephone Company, of Trenton, N. J., has had a 1½-ton Mack motor wagon in service since August, 1911.

Pedestrians passing the Bell Telephone office in Trenton Friday, Jan. 26, were surprised to see this machine hitched in front of a heavy wagon used to carry reels of lead-covered cable. The reason for this was a call from Princeton, N. J., about 5 p. m. for a reel of cable and some heavy tools that were needed in the university town, ten miles north, to clear cable trouble. A reel of cable weighing 3,200 pounds was loaded on the wagon, together with some small tools. Two men rode on the seat, making a total of 7,900 pounds to be towed. A heavy pump and tool box were placed on the machine and eight men, including the district foreman and Chauffeur Fisher, climbed on. The total load on the motor truck was about 1,900 pounds. Three inches of snow covered the ground and more was falling. A heavy wind was blowing also. Bets were made that the machine would not be able to pull the load, and that if it did get started it would not get to Princeton. At five minutes after six everything was ready and the outfit started on its journey. The driving wheels spun around a couple of times, then took hold and they were off. Doubts were expressed as to the truck being able to climb Montgomery street hill to Brunswick avenue, but it went up without difficulty. An hour and a half later it arrived in Princeton and work was started. The trouble was cleared about midnight, the gang had supper, and about 1 o'clock started on the return trip. It was bitter cold and the snow was about four inches deep. Brewer's Hill was climbed without a miss and at 2:20 a. m. men and load arrived at the Trenton office, 8½ hours from the time they had started. The trip of 20 miles to and from Princeton was made, 430 feet of 30-pair 22-guage, lead-covered cable was pulled out, two 30-pair splices were made and "wiped" in this time.

"To do the work successfully with horses, it was found necessary to use five two-horse wagons of three tons' capacity each, four of the teams making three round trips per day, or eighteen miles, while one team had to make four trips, or twenty-four miles; each of the five teams alternating in turn for the extra trip. This arrangement was found to be the most economical for operation with horses, and the daily cost, including all items such as driver's wages, repairs, depreciation, interest, etc., averaged over $6 per day each team, or a total daily cost for the five teams of about $30.

"Believing that it could reduce this expense considerably by using a motor truck, the company purchased a Knox 6-ton truck fitted with a 50-horsepower motor. Very careful records were kept of this vehicle also and the results so far have been truly astonishing. Very liberal allowance was made for tire repairs, depreciation, wages, etc., and the daily cost figured close to $15. This single truck was found to be easily able to move the entire forty-eight tons of refuse in a working day of ten hours, supplanting five two-horse trucks and four drivers. The motor truck thus effected a saving of $15 a day, or actually paid for its cost, $5,200, in 347 working days."

To do this work without the motor wagon would have taken a 4-horse team for the cable truck and a single team to drive the tools and material to Princeton, at a cost of about $20 for team hire. This would have left the gang to go by trolley, and the trouble probably would not have been cleared before Saturday afternoon. The comparison between horse and motor is obvious.

Adams motor wagon used for transporting nitro-glycerine.

GOOD FOR MOORE.

The largest contract for motor trucks ever placed on the Coast has just been received by the F. L. Moore Company (Los Angeles, Calif.), from the Sperry Flour Company. These machines will be from 2 to 5 tons' capacity and will be delivered in San Francisco, Fresno, Oakland, Sacramento and Los Angeles. The Moore Comness. Mr. Moore states that the orders have increased at least 25 per cent every month for the past year. Repeat orders form a big proportion of the business of pany has just moved into its new factory at 2678-98 Lacy street, and is working night and day to keep pace with the business this concern.

IT CARRIES NITRO-GLYCERINE.

What is believed to be the only motor wagon in a service of this kind, is a truck recently delivered to the Independent Torpedo Company, by the Adams Bros. Company, of Findlay, Ohio. While commonly known as a "stock wagon," the truck in question is used for the transportation of nitro-glycerine from one state to another, replacing horse-drawn wagons formerly used in this service. The chassis is a regular stock proposition, the only extra equipment being Swinehart cellular non-skid tires on all the wheels. The regular body is lined with a pan, in which rests a special body, fitted with compartments for holding the cans. This special or inner body is also fitted with a pan, which guards against any of the explosive getting into the running gears in case a can should spring a leak. This body loaded for a trip has a capacity for hauling 720 quarts of nitro-glycerine.

BIG ORDER FOR LANSDEN.

John R. Kinsey, general sales manager of the Lansden Company, was all smiles when seen recently in Chicago just before leaving for the east, the explanation being a telegram from the Lansden factory at Newark, N. J., as follows:

"Adams Express, who have over 100 of our trucks in service, have just given us their sixteenth repeat order for fifty one and a half and two ton trucks, 1912 model."

"THE LANSDEN COMPANY."

This is one of the largest single orders for electric trucks ever placed and may be taken as conclusive evidence that there is no question in the minds of the express companies as to the economy of the electric for this service. It is also a striking vindication of the Edison storage battery, coming as it does at the end of one of the worst spells of winter weather this country has even known, and shows that there is no foundation whatever for the claim that the Edison will not operate successfully in cold weather. Edison batteries are used in all Lansden trucks.

Brazil is a splendid field for American motor wagons, according to a prominent editor in Rio Janeiro.

The F. L. Moore Co., Los Angeles, Cal., recently sold 8 motor wagons of various sizes to the Midway Gas Company.

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TRUCKS AND TRAFFIC.

By A. W. ROBINSON, Truck Sales Manager, The Locomobile Co. of America.

Traffic conditions in congested portions of our large cities have been so greatly improved by the power wagon that it is not a wonder that so much co-operation has been obtained from the municipal authorities and from the heads of the various railroad and shipping companies. Today the owner of the motor wagon finds conditions vastly improved over those of three years ago, but there is still room for improvements and for added facilities whereby the efficiency of the machine can be so increased as to result in a still further saving for the owner, for the municipality, and for the transportation companies.

The efficiency of a motor wagon varies directly with the percentage of time during which it is transporting producing loads. Consequently every minute lost, either through delays due to the congestion of traffic, through waits to get up to or away from a loading platform, or through the necessity of making detours to avoid streets which have been closed by the municipal authorities, all go to cut down the efficiency of the machine by preventing it from making the number of ton miles which, under normal circumstances, it should.

From the owner's viewpoint it is not reasonable to expect him to incur a large expense and make a heavy investment for power wagons, each of which would supplant three two-horse teams, if such an investment is not a paying one. Various municipal and transportation officials, realizing the immense advantage of the motor wagon and knowing that it is saving them large amounts of money through its relieving congestion, are co-operating with the owner to eliminate many of the delays which in the past proved so alarming.

Municipal authorities find that motor traffic has, from their viewpoint, three great advantages over horse traffic. They find that the motor truck is less destructive on the street, reducing the maintenance charges of the street repair departments; they know that the reduction of the amount of horse debris, due to the supplanting of the horse by the motor wagon, not only effects a large financial saving but it also has resulted in a betterment of the public health, due to the more sanitary condition of the streets. They also appreciate the fact that the power wagon has decreased, for any given tonnage, the number of vehicles required, with a consequent relieving of traffic congestion at rush hours. This last is a very important factor in municipal conditions today and can be better realized when it is known that the normal large capacity power wagon, which under ordinary circumstances will supplant three two-horse teams, not only occupies a space equivalent to about only 30 per cent of the actual length of three such teams and wagons, but also, owing to its great flexibility and ease of control, it can follow closer to the vehicle immediately preceding it. As an actual fact, assuming that the traffic conditions in any given street are as congested as they are today, something over four times as much tonnage could be carried past a given point in a given time if all the traffic were carried on motor vehicles. Or assuming that only the same tonnage were to be transported, traffic conditions would be greatly relieved and congestion would be practically eliminated. Municipal authorities are doing all they can to further this end by keeping the streets in better repair, and by giving the faster moving motor vehicle the preference wherever possible. It is probable that in the near future the municipalities will co-operate further by opening many streets which are now closed to heavy traffic, and thus enable the machine to save time by eliminating detours which formerly were necessary.

Immense improvements have also taken place in the last few years at the railroad depots and at the wharves. Where formerly the motor wagons were compelled to take their place in line and gradually work up to the platforms, today many progressive officials, intent on serving the best interest of their own stockholders, have minimized traffic delays by providing special platforms for motor trucks only. Railroad officials, trained and educated in the handling of freight, traffic experts in the broadest sense of the word, realize better than any one else the need of speed, and they welcome any innovation which tends to relieve any congestion on their own platform, and which diminishes the time in transporting goods from the factory to the shelves of the distributor. While the idea of reserving a platform for motor wagons only is a comparatively new innovation, railroad after railroad is adopting the idea as fast as conditions and expediency will permit, and the percentage of space so reserved is increasing far more rapidly than any one not thoroughly conversant with the situation would imagine.

The same conditions obtain at the wharves. Steamship traffic men, owing to the greater intervals elapsing between their shipment, are far more troubled by freight congestion than the railroad traffic men are, and they appreciate the relief from congestion afforded by the motor trucks. The power wagon has been valuable to steamship men in another way. If a wharf can be quickly cleared and a new cargo as quickly put on the wharf, sailings can be more frequent without increased wharfage facilities, a very serious problem when the comparatively small number of good wharves and of really good ports is considered. Steamship men in their endeavor to take advantage of benefits accruing from the motor truck have done a great deal for the owner.

Only a few years ago, before the steamship men took an active interest in motor trucks, foolish fire regulations, since repealed, made it impossible to run a motor wagon on a wharf in any of the large cities in this country, and it is only recently that the wharves have been sufficiently well constructed as to stand up under a moving concentrated load as heavy as a large capacity motor vehicle.

The extent to which co-operation has been carried out might be continued indefinitely, but let it be sufficient to say that today every effort is being made to increase the scope and the field of the power wagon, not only by the manufacturer and by the user of these vehicles, but by all parties directly or indirectly interested in the great problem of transportation. Every improvement in traffic depot or wharf conditions not only effects a saving for the truck user, the railroad man, or the shipping man, but also is of vital importance to the public at large. The public's interest lies in the fact that minimizing of delay means a lower transportation cost. Every cent saved in transportation between the producer and the user eventually results in a lower price for the user. While in the individual case this saving is large, in the aggregate an immense amount of money will be saved when traffic conditions are such that the majority of goods distributed in the various cities and towns are transported on motor wagons.

STEPHENS JOINS DART CO.

Raymond Stephens has been appointed general sales manager of the Dart Manufacturing Company, Waterloo, Iowa. Mr. Stephens has been identified with the automobile industry for the past six years, having been connected with the Buick, Kissel and Lauth-Juergens companies. He was formerly sales manager for the Randolph Motor Car Company, the Fidelity Motor Car Company and the Warner Clutch Company. Mr. Stephens believes there is a great future for the light delivery car and, in the face of several flattering offers, decided to cast his lot with the Dart company, maker of the "Dart" light delivery car.

John Immel & Sons, Columbus, Ohio, are about to engage in the manufacture of electric trucks.

The Wells-Fargo Express Company in Hutchinson, Kans., recently received three new extra high motor wagons for use in the local service.

During the last week in March, Cuyler Lee, distributer of Packard trucks in the state of California, secured orders for 30 three-ton machines in San Francisco alone.

A 45-hp. motor dump wagon is being used in and around Eugene, Oregon, to haul crushed rock for road building, and to spread it automatically along the roads to a depth of 2 to 12 inches, as may be desired.

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REMY NEWS.

In keeping with the general policy of the Remy Electric Company, Anderson, Ind., makers of Remy magnetos, to establish service stations in all large cities, two new service stations have been added to its organization. The service station in Atlanta, Ga., will be in charge of Alexander-Seewald Company, and the Electric Sales Company will have the Savannah, Ga., station. The same service given at the factory may be had at these stations, it being their duty to care for the interests of the Remy users.

George B. Pieper has been appointed branch manager of the Boston, Mass., branch of the Remy Electric Company. Mr. Pieper is well known in the Hub city and has been connected with firms in the automobile industry in that section for a number of years.

Fred J. Urban has been made special representative for the Remy Electric Company in the middle west, covering the Chicago and Detroit territory with headquarters at the Chicago branch. Gerald Fitzgerald has been transferred from the Detroit branch to the sales force of the Chicago branch and A. C. Hyser is now connected with the Detroit branch of the Remy Electric Company.

JOSEPH DIXON CRUCIBLE CO.

At the annual meeting of the stockholders of the Joseph Dixon Crucible Company held at the company's main office in Jersey City, N. J., on April 15, the retiring board of directors, consisting of Geo. T. Smith, William Murray, Edward L. Young, William H. Corbin, Geo. E. Long, William G. Bumsted and Harry Dailey, was unanimously re-elected.

Officers elected for the ensuing year are as follows: President, Geo. T. Smith; vice-president, W. H. Corbin; treasurer, Geo. E. Long; secretary, Harry Dailey; assistant treasurer and assistant secretary, J. H. Schermerhorn.

There were voted 9,304 shares of a total of 10,000. A number of stockholders attended the meeting and expressed themselves as well pleased with the company's showing and with future prospects.

VELIE IN NEW FACTORY.

The Velie Motor Vehicle Company has completed and is now occupying its new motor wagon factory at 25th street, Moline, Ill. All Velie trucks will be manufactured in the new factory, which cost $150,000.

The Emergency Hospital, Washington, D. C., has installed an electric ambulance.

Vienna has just installed a municipally owned electric bus service which is not favorably regarded by English motor wagon authorities.

THE FERROMATIC TIRE.

A new tire has recently appeared on the market, which introduces a new principle into modern tire construction. This new tire is intended by its makers to solve the tire problem for owners of light pleasure cars, light delivery cars, light trucks and similar gasoline-propelled vehicles and all types of electric cars.

A company has been incorporated with a capital of $180,000, under the name of the Ferromatic Tire & Manufacturing Company, of Kansas City, Mo., and Cleveland, Ohio, to manufacture this tire, and it has already secured extensive distribution throughout the West and is at present engaged in a campaign for dealers through the Middle West and Eastern states. Dealers for "ferromatic"

"Ferromatic" spring tires.

tires will be given the exclusive agency in their particular localities.

The "ferromatic" tire consists of a metal shell in two separate parts, or rings. The outer shell is covered with a solid rubber tread of ample thickness, which is furnished in both the plain and non-skid types. Between the outer and inner metal shells are placed from five to eight diagonal vanadium steel helical springs, which hold the two shells concentric under ordinary conditions. The give-and-take of the many diagonally placed springs enables the tire to take up all shocks due to rough pavements and uneven road surfaces, while the even distribution of the jar over the total number of springs eliminates all objectionable bouncing.

The "ferromatic" tire has been made to fit any standard type of wheel, including those used with quick detachable or clincher rims and some types of demountable rims, without any alteration to the wheel whatever. When fastened on the wheels, they weigh very little more than the ordinary pneumatic tire and therefore they add no appreciable weight to the car.

Many advantages are claimed for this tire. In appearance it differs very little from the ordinary tire and it is claimed it gives the car owner the maximum of safety and economy, while at the same time giving his car resiliency and easy-riding qualities equal to those produced by pneumatic tires and shock absorbers.

UNDERSLUNG CHASSIS.

The General Motors Truck Company has brought out an underslung chassis that will allow loading and unloading of heavy materials with ease. This is accomplished by suspending the springs differently and bringing the chassis frame and body lower to the ground than it is in the standard chassis. The springs are placed under the axles, thereby gaining the space taken by them in the standard construction. In addition to this, the frame is brought still lower by side members being raised over the axles. This type of chassis will be made in 3½ and 5-ton capacities.

INSTRUCTION BOOK.

Valuable instructions in the care and operation of electric wagons in general and those of the Waverley Company in particular are contained in "The Waverley Instruction Book (commercial vehicle)" recently gotten up for distribution by the Waverley Company, Indianapolis, Ind. All mechanical parts of the machine are taken up and considered in detail, the section on batteries being particularly valuable.

There were 7,300 motor cabs in London on November 1 last, and the number is daily increasing.

CLASSIFIED ADVERTISING.

SALESMAN WANTED—A producing salesman for auto trucks. Must be a man of character, and one that has gotten results. We have the easiest selling proposition on the market today, from the standpoint of a superior article for less money.

WANTED—Two or three commission men to establish agencies on a new 1½-ton motor truck being manufactured by an old established firm of ample resources. Address B, care of this paper.

BARGAINS in high grade panel top delivery bodies with doors in rear. We have a quantity to close out, $70 to $100. Write for prints and particulars. The Barndt & Johnston Company, Columbus, Ohio.

WANTED — Competent experienced business manager for Auto Truck Factory established three years and doing good business. Three up-to-date 4-cylinder models. Must interest himself financially. Good salary and percentage of net profits. Splendid opportunity for right man. Address H. F., care the "Power Wagon," Chicago.

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VARSITY MEN IN TIRE MAKING.

The development of the finer details of the automobile tire business was never more forcibly exemplified than in the statement of W. D. Shilts, manager of salesmen for the Goodyear Tire & Rubber Co., who says that many of the largest and best universities in the country are represented on the Goodyear staff of experts.

"It used to be," says Mr. Shilts, "that the business of creating a rubber product was considered purely a workman's job, but the technical side of the business has developed wonderfully in the last few years. Rubber and tire manufacturers are reaching out in every direction for experts—for trained men. For example, the Goodyear Tire & Rubber Co. has in its employ, in the experimental and other departments of production, not less than 17 alumni of Massachusetts Institute of Technology, to say nothing of the alumni of other first class colleges who are Goodyear men. Among the colleges represented on our payroll I might mention Yale, Harvard, Pennsylvania, Michigan, Cornell, Princeton, Reserve, Bowdoin, Williams, Bethany, Case, Buchtel, Wooster, Mt. Union and Colgate. Tire manufacturers, judging from the experience of the Goodyear Co., have realized that there is a difference between modern and old time business methods, and they are equipped accordingly. University men have had a great deal to do with bringing the tire business to its present state of advancement and perfection. Goodyear university men could quickly form a football team that would include names very well known on the gridiron. And their achievements in the laboratory are not less noteworthy. You may remember that some time ago the president of the Massachusetts Institute of Technology made a tour of the country and visited a number of the larger cities where he was banqueted by alumni of Massachusetts Tech. One of the most notable banquets of the tour was given, not in the metropolis, but in Akron, Ohio, a city of 70,000 people in which the rubber tire industry has taken over a large number of the live wires that the Massachusetts Institute of Technology had been turning out. With the Goodyear Company, at least, tire making is not guesswork, but has been reduced by experts of the highest grade to an exact science."

ORDER AND REPEAT ORDER.

Getting a repeat order for motor wagons before the first order was fairly in the freight cars, was the gratifying experience of the Chase Motor Truck Company, of Syracuse, N. Y. The buyers which thus showed their absolute confidence in the Chase wagons were Stern Brothers, who have a great dry goods establishment in New York City.

Following out the well known and distinctive style of this concern, the selected power wagons will have a rich coach blue body with center panel of Tuscan red and running gears in yellow.

As is well known, Stern Brothers have one of the most complete delivery systems of any city in the United States, and in order to accommodate their rapidly expanding delivery radius they have been giving the greatest consideration to motor delivery. For some time past the problem of cheap and prompt delivery has been a vital one to all the large New York stores, whose business covers the entire metropolitan district for a radius from 20 to 30 miles. To facilitate matters they have long been going to the expense of keeping relays of horses and men in several of the large surrounding towns, making large shipments to these places by over night freight to be delivered by their own wagons the next morning. The substitution of motor wagons for horse rigs will naturally eliminate this needless expense.

HEAT BOOMS TRUCKS IN SOUTH.

That the excessive heat endured in the South most of the year around is the biggest factor in the rapid adoption of motor trucks there is the word from George L. Sullivan, traveling representative of the Alco, who has just completed an 11,000 mile trip through the West and Southwest.

"Business men in the warmer climates realize," says Mr. Sullivan, "that horses there on account of the heat are put at an even greater disadvantage than otherwise. It is not surprising therefore that southern business men are in a receptive attitude toward the motor truck."

"One of the most significant things in the motor truck industry," he continued, "is the development of the demand for trucks in Texas. The most progressive motor car dealers are taking on agencies for the best trucks. This is true also of business men in other lines so situated that they can handle motor trucks.

"As an instance there is the Peden Iron and Steel Company of Houston and San Antonio, an old established company with large capital and an unusual organization. They have taken an agency for motor trucks. They have 24 traveling representatives. The largest owners of the company are men who have done a great deal toward the upbuilding of Houston.

"There is also the Levy-Kramer Auto Company of Dallas, which within two months has sold close to 100 motor cars. It has just contracted for a motor truck agency."

The "DART" $750 after May 1.

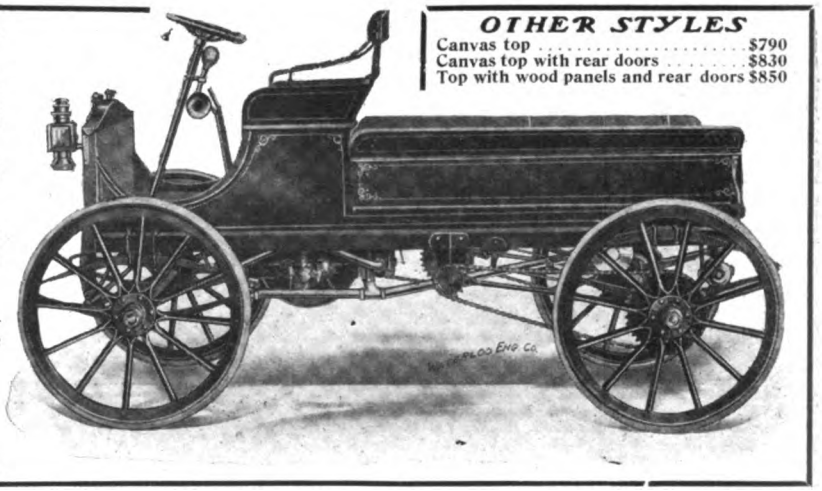
It's because we are making the new 1912 DART so much better. It's because we are using Parson's white brass and Hyatt bearings in the wearing parts. Because we are using heavier jack shafts, heavier springs, stronger tortion rods, and larger tires.

It's because of these and other improvements that we must increase the price of DART trucks to $750 after May 1, 1912.

From our agents everywhere are coming letters of commendation on our action. Quality tells in time and we're looking out for the future.

Write today for a free booklet. Better yet, write for our agency proposition.

The Dart Manufacturing Co.
Dept P. W. WATERLOO, IOWA

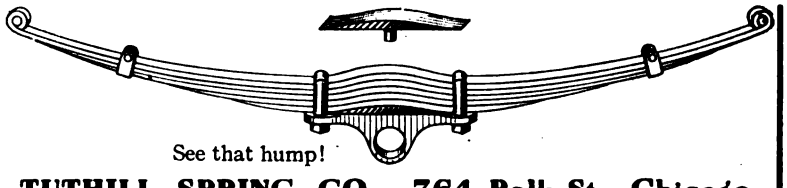


OTHER STYLES
Canvas top $790
Canvas top with rear doors $830
Top with wood panels and rear doors $850

TITANIC SPRINGS

Tougher than Vanadium—Cheaper than Vanadium

Neither NIB nor HOLE in center to hasten a break. Thirty years' experience enables us to make the best springs made. Let us be of service to you.



See that hump!

TUTHILL SPRING CO., 764 Polk St., Chicago

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CLASSIFIED BUYERS' GUIDE

Prepared for the convenience of buyers of motor wagons, parts and equipment. All the concerns listed under the various headings advertise regularly in the "Power Wagon."

AUTOMATIC MACHINERY.
Cleveland Auto Machine Co., Cleveland, O.

AXLES.
Driggs-Seabury Ordnance Co., Sharon, Pa.
Sheldon Axle Co., Wilkes-Barre, Pa.
Timken-Detroit Axle Co., Detroit, Mich.
Torbensen Gear & Axle Co., Bloomfield, N. J.

BEARINGS (Ball).
Barthel, Daly & Miller, New York City, N. Y.
Bretz, J. S., Co., New York City.
New Departure Mfg. Co., Bristol, Conn.
R. I. V. Co., New York City, N. Y.

BEARINGS (Roller).
Bower Roller Bearing Co., Detroit, Mich.
Hyatt Roller Bearing Co., Detroit, Mich.
Timken Roller Bearing Co., Canton, Ohio.

BRAKE LINING.
Johns-Manville Co., New York City, N. Y.
Woven Steel Hose & Rubber Co., Trenton, N. J.

CARBURETORS.
Zenith Carburetor Co., Detroit, Mich.

CASTINGS.
Jewell Steel & Malleable Co., Buffalo, N. Y.
Wehr Steel Co., Milwaukee, Wis.
Wetherill Finished Castings Co., Philadelphia, Pa.

CHAINS.
Baldwin Chain & Mfg. Co., Worcester, Mass.
Culver-Taylor Chain Works, Detroit, Mich.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Sarco Engineering Co., New York City, N. Y.
Whitney Mfg. Co., Hartford, Conn.

CLUTCHES.
Merchant & Evans Co., Philadelphia, Pa.
Otto Konigslow Mfg. Co., Cleveland, Ohio.

CONTROL LEVERS.
Otto Konigslow Mfg. Co., Cleveland, Ohio.

DIFFERENTIALS.
Cullman Wheel Co., Chicago, Ill.
Ross Gear & Tool Co., Lafayette, Ind.

DROP FORGINGS.
Park Drop Forge Co., Cleveland, O.
Western Drop Forge Co., Marion, Ind.
J. H. Williams Co., Brooklyn, N. Y.

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Commonwealth Edison Co., Chicago, Ill.

ELECTRIC MOTORS.
Westinghouse Electric & Mfg. Co., Pittsburgh, Pa.

ELECTRIC WELDING.
Standard Welding Co., Cleveland, O.

ELECTRIC WAGONS AND TRUCKS.
Baker Motor Vehicle Co., Cleveland, Ohio.
Couple Gear Freight Wheel Co., Grand Rapids, Mich.
General Motors Truck Co., Detroit, Mich.
General Vehicle Co., Long Island City, N. Y.
Joliet Auto Truck Co., Joliet, Ill.

FOOT PEDALS.
Otto Konigslow Mfg. Co., Cleveland, Ohio.

GASOLINE ENGINES.
Continental Motor Mfg. Co., Muskegon, Mich.
Hazard Motor Mfg. Co., Rochester, N. Y.
Palmer-Moore Co., Syracuse, N. Y.
Syracuse Gear Co., Syracuse, N. Y.
Western Motor Co., Marion, Ind.
Wisconsin Motor Mfg. Co., Milwaukee, Wis.

GAS-ELECTRIC WAGONS AND TRUCKS.
Couple Gear Freight Wheel Co., Grand Rapids, Mich.

GASOLINE STORAGE OUTFITS.
Air Tight Steel Tank Co., Pittsburg, Pa.

GASOLINE WAGONS AND TRUCKS.
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Alden Sampson Mfg. Co., Detroit, Mich.
American Locomotive Co., New York City.
Available Motor Truck Co., Chicago, Ill.
Avery Company, Peoria, Ill.
Bessemer Motor Truck Co., Grove City, Pa.
Bowling Green Motor Car Co., Bowling Green, Ohio.
Buckeye Mfg. Co., Anderson, Ind.
Chase Motor Truck Co., Syracuse, N. Y.
Commerce Motor Car Co., Detroit, Mich.
Dayton Auto Truck Co., Dayton, Ohio.
Federal Motor Truck Co., Detroit, Mich.
General Motors Truck Co., Detroit, Mich.
Gramm Motor Truck Co., Lima, Ohio.
Grand Rapids Motor Truck Co., Grand Rapids, Mich.
Harwood-Barley Mfg. Co., Marion, Ind.
Henry Lee Power Co., Chicago.
Ideal Auto Co., Fort Wayne, Ind.
International Motor Co., New York City, N. Y.
Jarvis Huntington Automobile Co., Huntington, W. Va.
Kissel Motor Car Co., Hartford, Wis.
Koehler, S. G., Co., New York City, N. Y.
Knickerbocker Motor Truck Mfg. Co., New York City, N. Y.
Knox Automobile Co., Springfield, Mass.
Lauth-Juergens Motor Car Co., Fremont, O.
Lincoln Motor Car Co., Chicago, Ill.
Lippard-Stewart Motor Car Co., Buffalo.
W. H. McIntyre Co., Auburn, Ind.
Mercury Mfg. Co., Chicago, Ill.
Motor Wagon Co. of Detroit, Detroit, Mich.
National Motor Truck Co., Bay City, Mich.
New Haven Truck & Auto Works, New Haven, Conn.
Packard Motor Car Co., Detroit, Mich.
Peerless Motor Car Co., Cleveland, Ohio.
Pierce Arrow Motor Car Co., Buffalo, N. Y.
Piggins Motor Car Co., Racine, Wis.
Sanford Motor Truck Co., Syracuse, N. Y.
Speedwell Motor Car Co., Dayton, Ohio.
Universal Machinery Co., Milwaukee, Wis.
Velie Motor Vehicle Co., Moline, Ill.
Victor Motor Truck Co., Buffalo, N. Y.
White Co., Cleveland, Ohio.
Willys-Garford Sales Co., Toledo, Ohio.

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Sheldon Axle Co., Wilkesbarre, Pa.

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LOCK WASHERS.
Positive Lock Washer Co., Newark, N. J.

LUBRICANTS.
Jos. Dixon Crucible Co., Jersey City, N. J.
Standard Oil Co., New York City, N. Y.

LUBRICATORS.
Bosch Magneto Co., New York City, N. Y.
Detroit Lubricator Co., Detroit, Mich.

MAGNETOS.
Bosch Magneto Co., New York City, N. Y.
J. S. Bretz Co., New York City, N. Y.
Remy Electric Co., Anderson, Ind
C. F. Splitdorf, New York City, N. Y.

NON-SKID DEVICES.
Atlas Chain Co., Brooklyn, N. Y.

PRESSED STEEL FRAMES.
Driggs Seabury Ordnance Corp., Sharon, Pa.
Hydraulic Pressed Steel Co., Cleveland, O.
A. O. Smith Co., Milwaukee, Wis.

RADIATORS.
Briscoe Mfg. Co., Detroit, Mich.
Harrison Radiator Co., Lockport, N. Y.
W. J. Kells Mfg. Co., New York City, N. Y.
Livingston Radiator Co., New York City.

RECORDING INSTRUMENTS.
Veeder Mfg. Co., Hartford, Conn

SCREW MACHINE PARTS.
National Cycle Mfg. Co., Bay City, Mich.

SEAMLESS STEEL TUBING.
Standard Welding Co., Cleveland, Ohio.

SIGNAL HORNS.
Automobile Supply Mfg. Co., Brooklyn, N. Y.

SPARK PLUGS.
Bosch Magneto Co., New York City, N. Y.
Progressive Mfg. Co., Torrington, Conn.

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Perfection Spring Co., Cleveland, Ohio.
Sheldon Axle Co., Wilkesbarre, Pa.
Spring Perch Co., Bridgeport, Conn.
Tuthill Spring Co., Chicago.

SPROCKETS.
Cullman Wheel Co., Chicago.

STARTING CRANKS.
Otto Konigslow Mfg. Co., Cleveland, Ohio.

STEERING GEARS.
Baldwin Chain & Mfg. Co., Worcester, Mass
Lavigne Gear Co., Detroit, Mich.
Muncie Gear Co., Muncie, Ind.
Ross Gear & Tool Co., Lafayette, Ind.

STEEL TANKS.
Air-Tight Steel Tank Co., Pittsburg, Pa.
Janney-Steinmetz Co., Philadelphia, Pa.
Western Drop Forge Co., Marion, Ind.

STORAGE BATTERIES.
Gould Storage Battery Co., New York City.
Philadelphia Storage Battery Co., Philadelphia, Pa.

TIRES (Solid).
Diamond Rubber Co., Akron, O.
Firestone Tire & Rubber Co., Akron, O.
Jas. L. Gibney & Bro., Philadelphia, Pa.
Diagonal Block Tire Co., Urbana, Ohio.
B. F. Goodrich Co., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Kelly-Springfield Tire Co., Akron, Ohio.
Motz Tire & Rubber Co., Akron, O.
Polack Tyre Co., New York City, N. Y.
Republic Rubber Co., Youngstown, Ohio.
Swinehart Tire & Rubber Co., Akron, O.
U. S. Tire Co., New York City, N. Y.

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Covert Motor Vehicle Co., Detroit, Mich.
Driggs Seabury Ordnance Corp., Sharon, Pa.
Hazard Motor Mfg. Co., Rochester, N. Y.
Muncie Gear Co., Muncie, Ind.
New York Gear Works, Brooklyn, N. Y.
Syracuse Gear Co., Syracuse, N. Y.

UNIT POWER PLANTS.
Hazard Motor Mfg. Co., Rochester, N. Y.

UNIVERSAL JOINTS.
Blood Bros. Machine Co., Kalamazoo, Mich.
Kinsler-Bennett Co., Hartford, Conn.
Spicer Mfg. Co., Plainfield, N. J.

WHEELS.
Hayes Wheel Co., Jackson, Mich.
Schwartz Wheel Co., Philadelphia, Pa.

WHEEL MAKING MACHINERY.
Defiance Machine Works, Defiance, O.

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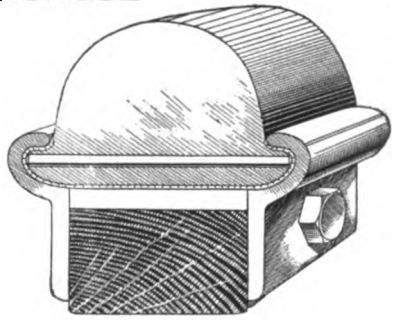

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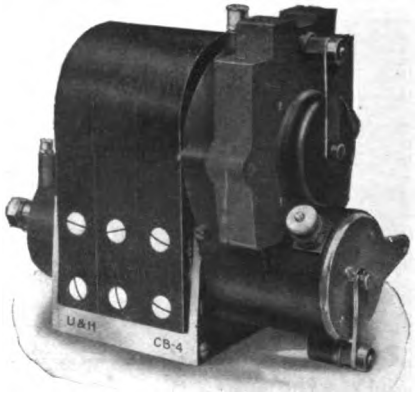
$20.00 **For this $93.00 Four Cylinder U. & H. Magneto**



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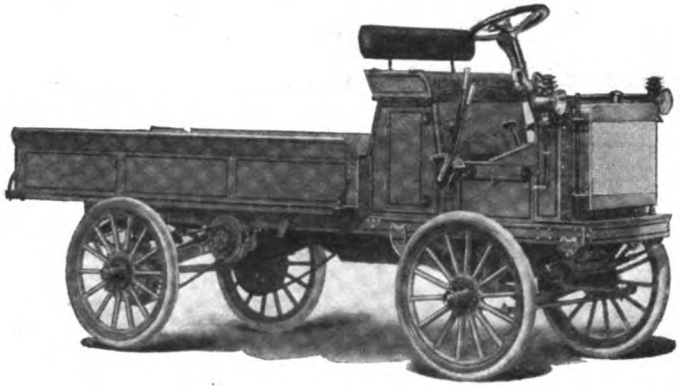

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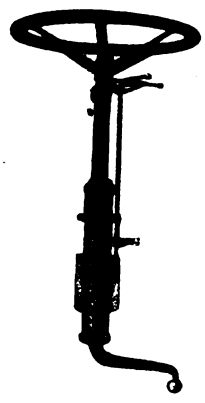

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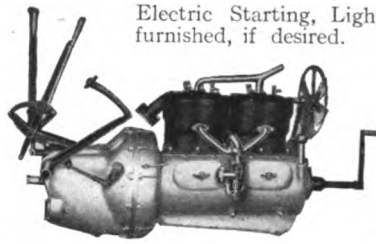

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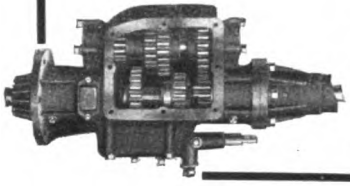

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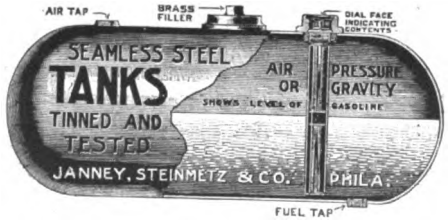

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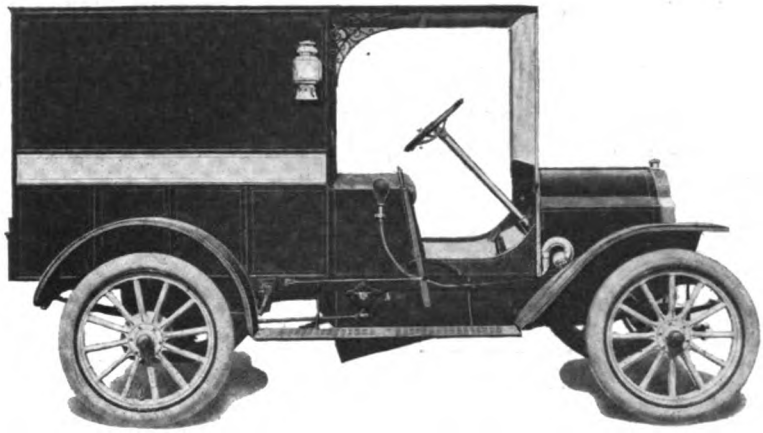

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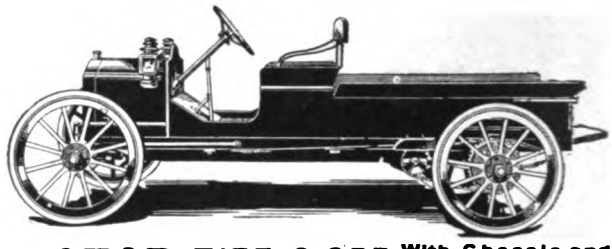

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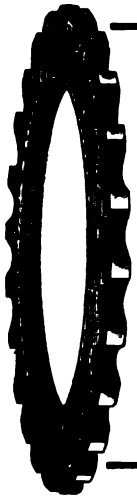

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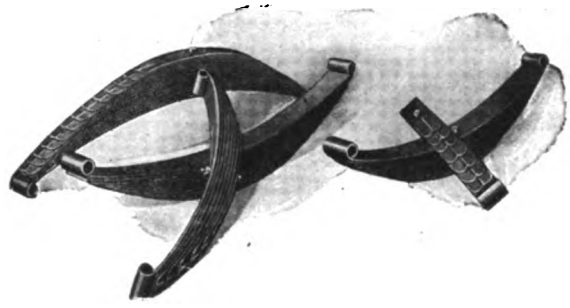

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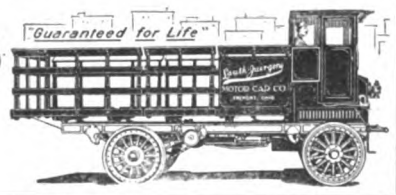

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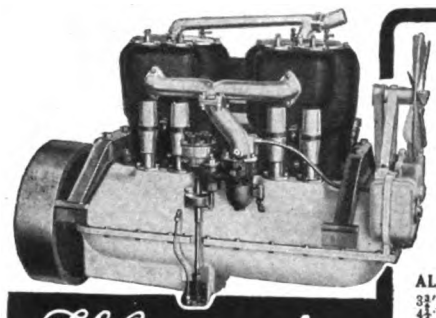

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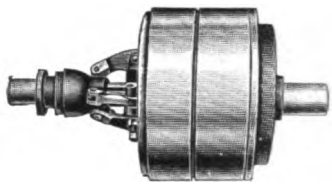

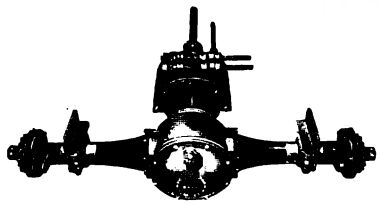

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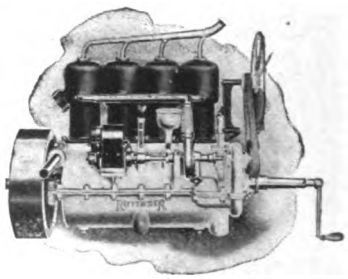

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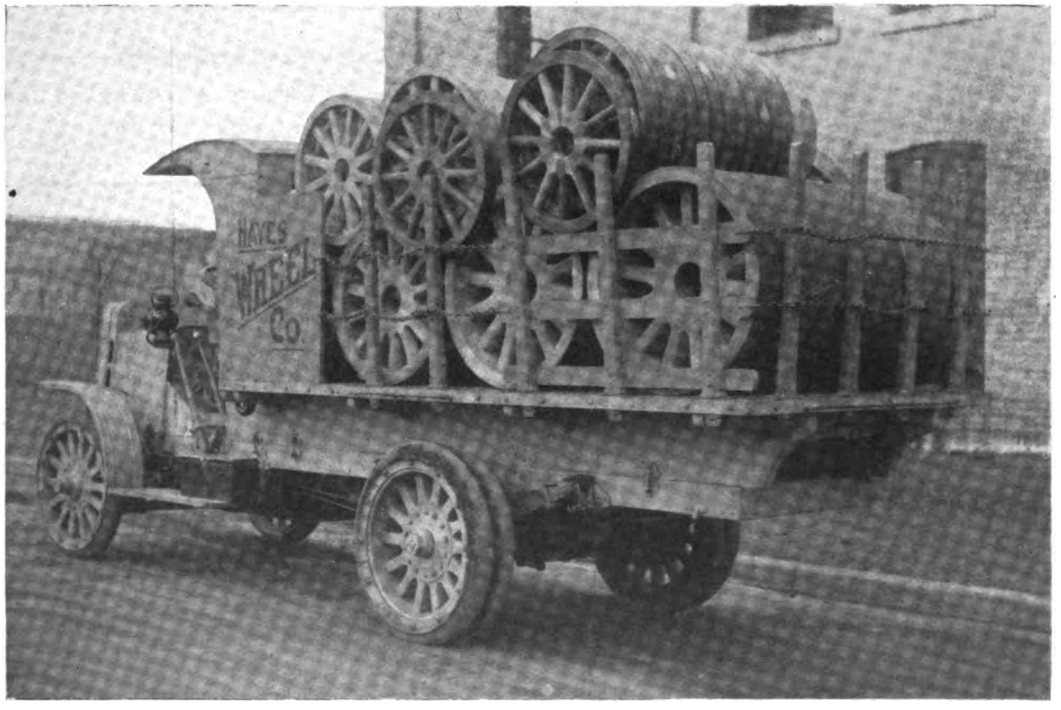

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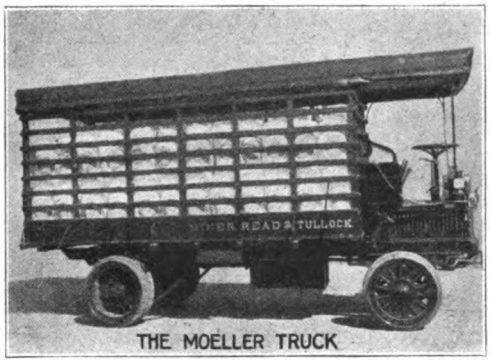

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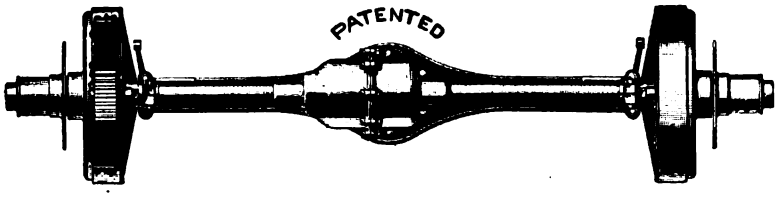
THE NEW HAVEN TRUCK & AUTO WORKS, New Haven, Conn.

Size, 1500 lbs. to 3 tons.

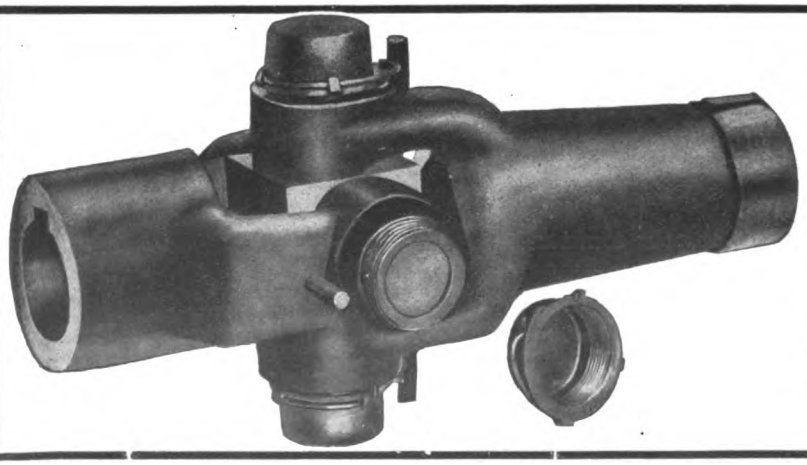


Size, 1500 lbs. to 3 tons.

Torbensen Internal Gear Truck Axle

Torbensen Gear & Axle Company

Bloomfield, N. J.



BLOOD BROS'. UNIVERSAL JOINTS

Style A, made for all sizes of shafts up to 3 inches.

Strongest and most durable joint for motor trucks. Used for years as a regular equipment on many of the best makes of trucks.

BLOOD BROS. MACH. CO., Manufacturers
Kalamazoo, Mich.

Please mention the "Power Wagon" when writing to advertisers.

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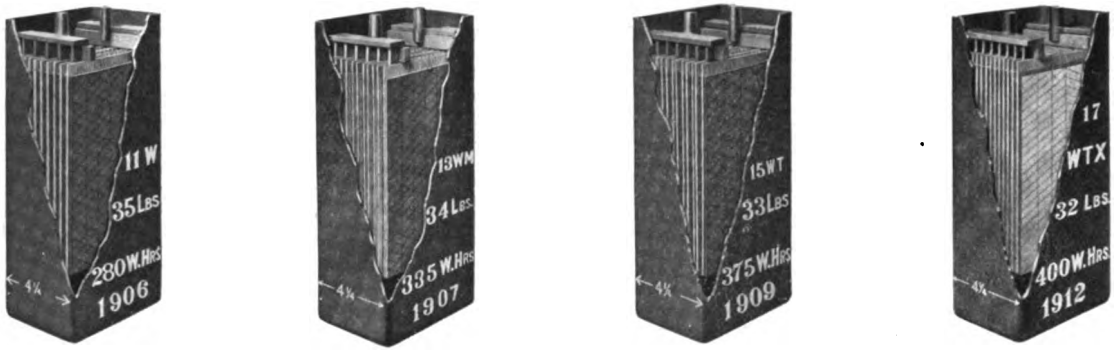
PHILADELPHIA THIN PLATE



Are you carrying *now*, in your electric car, dead battery weight which will only become available for power *next year?*

Each pound of storage battery should represent a certain amount of *available* power.

One pound of "thick plate" battery will furnish 8 to 9 watt hours.

One pound of PHILADELPHIA thin plate battery will furnish 14 to 15 watt hours.

The mileage of a car is proportional to the watt hour capacity of the storage battery.

That explains why you should have a PHILADELPHIA thin plate battery. *Send for booklet.*

Philadelphia Storage Battery Co.

ONTARIO AND C STREETS

PHILADELPHIA, PA.

DEPOTS

Philadelphia New York Chicago St. Louis Boston Rochester Detroit

Please mention the "Power Wagon" when writing to advertisers.

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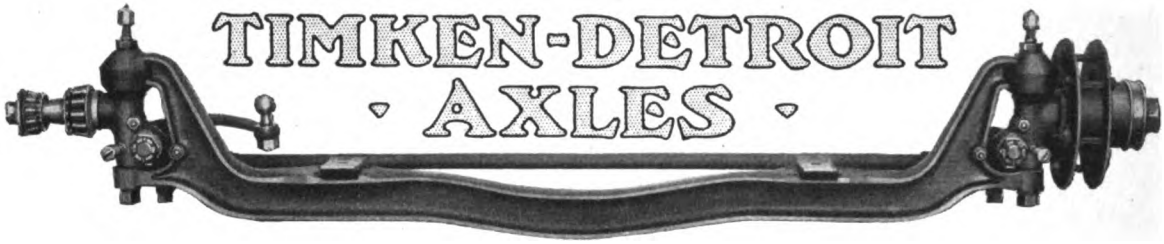
The Story of the Tell-Tale Dial

Upon the wall of the factory chief's room is a little instrument on whose dial a story is written each day.

A tale white-hot with interest to the man with the key to its meaning. It's a story of faithfulness in the heat-treating of



The instrument with the tell-tale dial is a recording pyrometer.

It is connected each day and each night with one of the heat-treating furnaces—which furnace only the chief himself knows.

Wires lead from the electric resistance thermometer in that furnace to the pyrometer on the chief's wall.

Clockwork and the current operate a pen which records in clear-cut lines the temperature for every minute and hour of the time.

A Check on Other Records

Out in the furnace room is another pyrometer. That one is for the man who reads the temperature of all the furnaces each quarter of an hour.

He is the man whose signals of red, white or green light at each oven tell the furnace man how to regulate his fire and when to remove the glowing steel.

Now, who is to prove that the work is done right? Who knows that no one has cooled the furnace by opening its door in the night?

Answer—The tell-tale dial.

Timken Heat-Treatment is an Exact Science

Each piece in the Timken-Detroit Axle has its particular heat-treatment.

The one treatment which will bring out the best that is in the kind of steel used for the particular work each piece must perform.

Long experience and careful records of results have determined the exact degree of heat and exact length of time for each part. *And the dial tells that the work is done right.*

The story of the dial is one of the interesting stories in Timken-Detroit manufacture.

It is this back-of-the-scenes integrity of manufacture—this extreme care in every process—that produces axles which stand up to the gruelling test of service day after day and year after year over all kinds of roads.

The Timken-Detroit Axle Company

Detroit, Michigan, U. S. A.

The only axle manufacturer licensed to make axles equipped with the famous Timken Roller Bearings

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Speedwell 4-ton Truck of Abattoir Company, Cincinnati. One of 6 Speedwell Trucks now in the service of this company.

Speedwell MOTOR TRUCKS

Two, Four and Six Ton Capacities

SERVICE

Speedwell Service is a big factor in the success Speedwell Trucks are enjoying.

A truck may be well built; use only high-grade materials; employ only the most skilled mechanics; but without good service to complement these necessary elements, it will not be a complete success.

Speedwell service is rendered by our dealer as well as from our factory.

Our dealers are thoroughly trained in Speedwell methods, Speedwell construction and Speedwell service.

The dealers' service departments are just as important as their sales departments and insure to Speedwell owners continuous and maximum efficiency from their trucks.

Literature Upon Request

THE SPEEDWELL MOTOR CAR COMPANY

655 ESSEX AVENUE, DAYTON, OHIO

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POLACK TRUCK TYRES

by their **absolute guarantee** assure a lower cost per mile than any other tyre made.

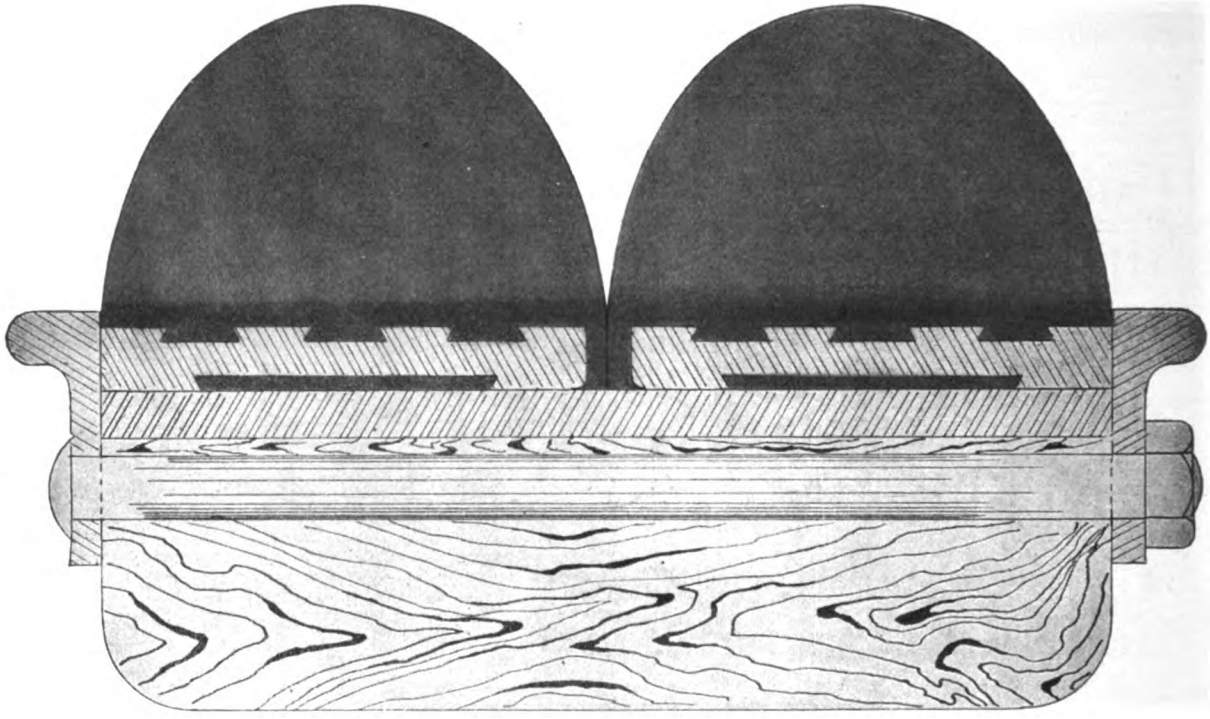
If fitted with the sizes which we recommend for a three-ton truck the tyre cost per truck mile is 5¼ cents, **maximum.**

For a 5-ton truck the **maximum** tyre cost is 7¾ cents per mile.

This cost will be reduced according to the additional mileage secured above the guaranteed service.

This additional service amounts to from 50% to 200% above the guaranteed mileage, according to road conditions and the care with which the truck is operated.

The costs published by experienced operators of trucks show an **average** tyre cost with other tyres of 8¾ cents to 11 cents per mile.



After January 1st, in addition to the present European standard sizes, Polack Tyres of the demountable type will be supplied in sizes to fit American S. A. E. standard wheels.

Polack Tyre Company

Ehret Building, Broadway and 59th St., New York

1004 Michigan Ave., Chicago
247 Jefferson Ave., Detroit
512 Mission St., San Francisco
146 Sumner St., Boston, Mass.
505 Liberty Ave., Pittsburg
917 First Ave. So., Minneapolis
930 So. Main St., Los Angeles
516 Parkway Bldg., Philadelphia, Pa.
Benoist & Aull, Benoist Bldg, St. Louis

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In England, worm drive for motor trucks is rapidly succeeding other forms of gear reduction. It was an assured success for nearly ten years before its adoption by the makers of the Pierce-Arrow Truck.

More than a year's service on the Pierce-Arrow Trucks now assures the success of worm gear drive in America—and this definite guarantee shows where the manufacturers stand regarding it:

The worm wheel and worm shaft, generally known as worm gear construction, employed in the Pierce-Arrow Truck, are warranted to fulfill their functions for one year from date of shipment under normal service.

PIERCE-ARROW
5-TON MOTOR TRUCKS

THE PIERCE-ARROW MOTOR CAR COMPANY, BUFFALO, N. Y.

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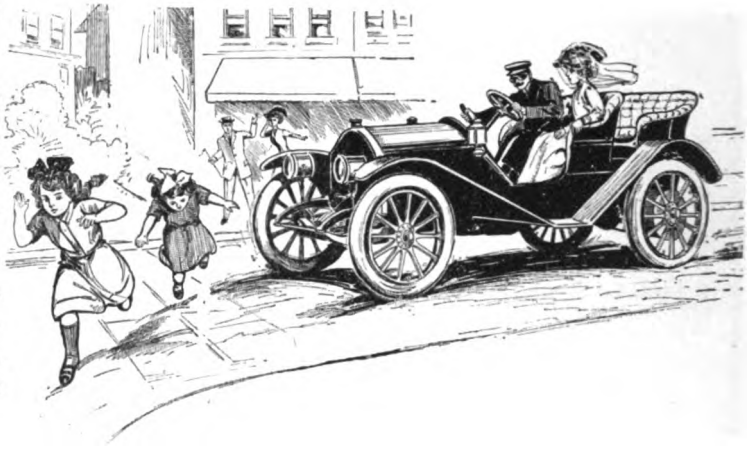
COULD YOU STOP SHORT IN A CASE LIKE THIS?



You can lock the wheels of your car almost instantly if the brakes are lined with J-M Non-Burn Brake Lining. Impartial tests prove this.

This lining is made of Asbestos, which means a mineral lining against a metal drum. This gives the greatest braking efficiency known to engineering science. Yet, with less pressure on the brake lever, you can stop just as slowly as you wish.

J-M NON-BURN BRAKE LINING

is also practically indestructible. Frictional heat cannot char or burn it; oil, gasoline or water cannot injure it.

Be sure to get J-M Non-Burn and your car will always obey the slighest pressure on the brakes. The name is plainly stamped on every few feet of this lining. Don't take chances with cheap substitutes.

Ask nearest branch for sample and our booklet, "Practical Pointers on the Care of Automobile Brakes."

H. W. JOHNS-MANVILLE CO.

MANUFACTURERS OF ASBESTOS AND MAGNESIA PRODUCTS — ASBESTOS — ASBESTOS ROOFINGS, PACKINGS, ELECTRICAL SUPPLIES, Etc.

Baltimore Buffalo Cleveland Detroit Kansas City Milwaukee New Orleans Omaha Pittsburgh Seattle
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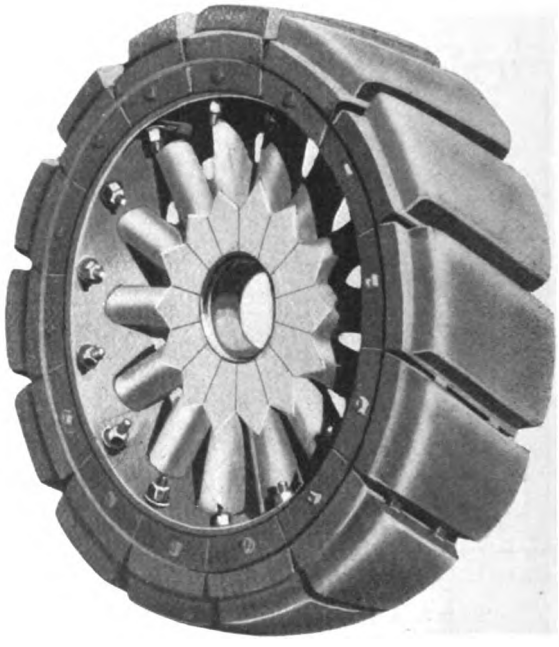
For Canada:—THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED.
Toronto, Ont. Montreal, Que. Winnepeg, Man. Vancouver, B. C.

DIAGONAL BLOCK TIRES

Absolutely insure uninterrupted service of your truck. It is necessary to replace only a block—a fractional part of your investment—in making replacements. Each block demountable in 5 minutes, by removing 4 bolts—only tool necessary is a wrench.

A New Block Makes a New Tire.



The Diagonal Way

Saves Dollars by Miles

AGENTS WANTED—Exclusive selling rights guaranteed where we are not actively represented.

Our booklet **"The Diagonal Way"** Free upon request.

The Diagonal Block Tire Co.
URBANA, OHIO

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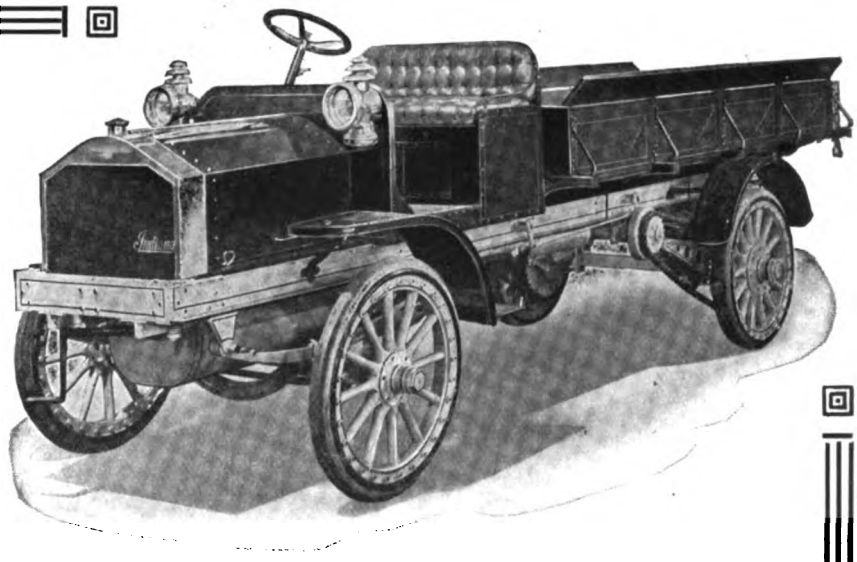
The INDIANA

1 to 1 1-2 Ton Truck



Made in Marion, Indiana, by a Long-Established Company of Ample Resources.

Built for Hard-Duty Service

MORE POWER—MORE STRENGTH IN EVERY STRAIN-BEARING PART—GREATER SIMPLICITY OF CONSTRUCTION—AND GREATER GENERAL SERVICEABILITY THAN YOU'LL FIND IN OTHER TRUCKS OF SIMILAR HAULING CAPACITY AND PRICE.

Compare the Extraordinary Value of the INDIANA With Any Other One and One-half-ton Truck Built —Compare the Specifications.

SPECIFICATIONS.

Engine—30 H. P. Rutenber, ignition Bosch DU 4. No 2 fixed magneto

Clutch—Multiple disc, 61 steel plates running in oil bath.

Transmission—Sliding gear selective type, 3 speeds forward, 1 reverse.

Steering Gear — Irreversible type with 16-inch hand wheel

Jack Shaft — Semi-floating type, shaft 1⅛ inches nickel steel.

Frame—5-inch channel steel.

Axles—Front, I-beam, 1¾x2¼ inches, 1⅛-inch spindle; rear, rectangular 2x2½ inches, 2⅛ inch spindle.

Tires — Solid rubber; front 34x3, rear 34x4.

Weight of chassis 2,850 pounds.

WE BELIEVE you automobile dealers and builders will appreciate the money-making possibilities of the **INDIANA** Truck.

It is in a class by itself as to value and its extraordinary price practically eliminates competition.

With the agency for the **INDIANA** in your territory you can walk away with all the ton to ton-and-a-half business in sight.

There is nothing in the market that can compare with it either in quality or price.

Think of it! A 30 H. P., 4 x 4, truck-type Rutenber motor that has been tried and tested under every known road and load condition for years, and found to more than "stand the gaff"; a 60 H. P. disc clutch containing sixty-one steel plates running in a bath of oil; axles forged in one piece, made under a chemical analysis at Pittsburgh, the home of good things made of steel; great roomy bodies built for any and every purpose, and all done in a factory at Marion, Indiana—the home of the Rutenber motor—by men who have been in the manufacturing business for generations and who have learned that the safest, most economical policy is to "build well or not at all."

If you want to earn an extra profit this year, if you want to make some "quick-money," set down and write us for more information about this remarkable truck—the 1 to 1½ ton truck that you can rely on to meet all the claims made for it.

We'll tell you all about the many mechanical features that make it a reliable, serviceable truck as well as an easy, quick seller. And we'll make you an agency proposition for your territory—if it hasn't already been snapped up—that cannot fail to interest you. Our output is limited (as it must be if we build as well as we should) and inquiries are coming in every day. So write today for territory.

HARWOOD-BARLEY MFG. CO.

200 HENDERSON AVE., MARION, INDIANA, U. S. A.

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GOODYEAR Truck Tires

For Every Service

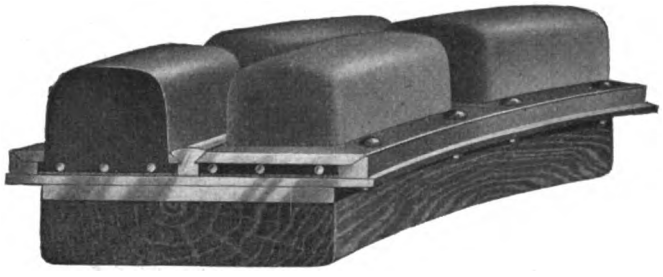
No matter what type of truck you own, what its duty may be, or what kind of streets it is operated on, there is a *Goodyear Tire that fits your needs*. We picture here four of our line of 1912 truck tires. Each is the most practical and economical tire we know how to build after 13 years' experience.

Please look them over.

Then—if you will write us the make and model of your truck, its duty and the kind of streets you have, we shall be glad to give you the advice of our Tire Experts.

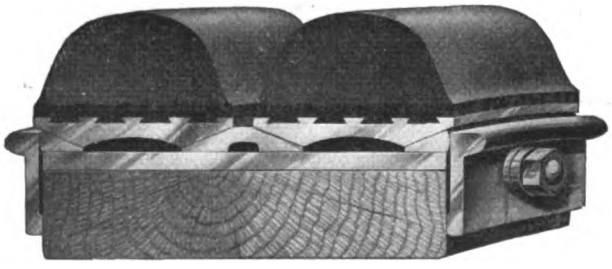
And we will send you an attractive circular which shows, in large illustrations, each of our truck tires and describes them minutely.

We have branches and agencies in 103 principal cities.



The Goodyear Individual Block Tire

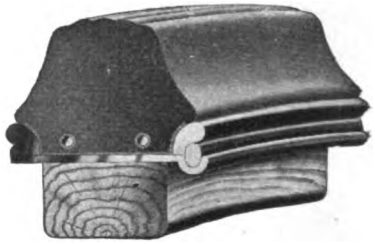
Pictured above. ***For heavy duty trucks requiring exceptional traction and non-skid features on rear wheel*** —Three advantages: (1) Cannot give out at base before tread wears out. (2) Economical and convenient. Instead of carrying extra tires you need but a few extra blocks. (3) Each block has its individual fastening. To remove a damaged block, simply loosen one block—and not a half dozen. Individual fastening holds block securely. Block cannot work loose, or chafe underneath. Blocks fit all sizes of wheels. All are same height and length, the width varying.



The Goodyear 10,000 Mile Demountable Solid Tire

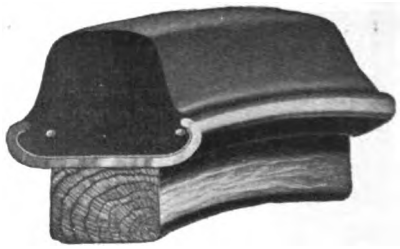
Pictured above. ***For heavy duty trucks.*** Easily put on or taken off. No need of tire-applying station. To replace tire, driver jacks up wheel, unbolts side flange, slips off wedge ring. No removing wheel. Jack, chisel and wrench only tools required. Job done by your man in your garage during spare time. Our demountable rims fit the S. A. E. Standard wheel. Tire has metal sub-base. To this metal is secured a hard rubber base. Soft rubber tread is vulcanized to hard rubber base. Tire cannot wear out at base before tread wears out. ***This tire carries a specific 10,000-mile guaranty.***

The Goodyear No-Rim-Cut Solid Tire



For light cars where speed, not load, is important. Has remarkable resiliency. Its concave sides allow tire to quickly adjust itself to road inequalities. It protects the mechanical parts of the car. Endless high carbon wires are molded in base of tire. The cross section of base between the side rings is greater than corresponding part of the rim. Tire has ample compression to hold tire on rim. Cannot creep. Cannot cut out at base. Fits Goodyear Quick Detachable Pneumatic Tire rim of corresponding sizes. Easy to apply—same as Goodyear No-Rim-Cut Pneumatic Tire —except clamps are used to force on inside rings so locking ring can be put in place. Goodyear No-Rim-Cut Pneumatic Tire also fits this rim.

Goodyear-Motz Truck Tire



For high wheel package delivery wagons or high speed trucks. No expert help required in applying. No brazing of side wires. No tools needed except simple hand tool which we furnish. Applied under compression. Dust, grit, etc., cannot work under it. Tough and resilient rubber. Distortion is confined wholly to tread. No stress at base. Tire remains on rim until worn out. Creeping impossible. This tire can be applied to a single piece or demountable clincher rim.

WRITE— Send today for Descriptive Circular of complete line of Goodyear Motor Truck Tires.

THE GOODYEAR TIRE & RUBBER COMPANY, AKRON, OHIO

Branches and Agencies in 103 Principal Cities **We Make All Kinds of Rubber Tires**

603 **Main Canadian Office, Toronto, Ont.** **Canadian Factory, Bowmanville, Ont.**

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The Durable Dayton

Durable Dayton Model M—Capacity 5 Tons

Model H—Capacity 2 Ton
Model K—Capacity 3 Ton
Model M—Capacity 5 Ton

The most dependable line of *Specially Designed* Motor Trucks produced by any one concern in the industry.

How well the three-ton Durable Dayton compares with other models of like rating on the market may be inferred from the following telegram:

Chosen from Among 21 Competitors

Dayton Auto Truck Co., Dayton, Ohio:

Secured order from the state of New York for 7 Model K (3-ton capacity) Durable Dayton motor trucks against 21 competitors.

WISHART—Dayton Auto Truck Co.

New York City, February 25.

The seven machines above referred to are being applied in state hospital service at Albany, Brooklyn, Binghamton, Kings Park, Long Island and other points in New York.

Some Choice Territory open to discriminating dealers.

The Dayton Auto Truck Co., Dayton, Ohio

Please mention the "Power Wagon" when writing to advertisers.

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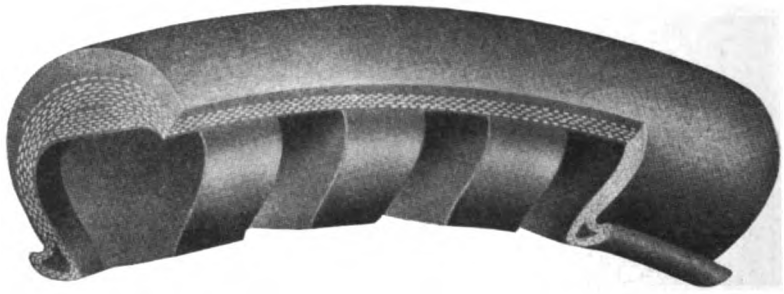
Perfect Resiliency Without Air

Dayton Airless Tires

Ride Easier Than Pneumatics
Wear Longer Than Solid Tires



Have proved records of 15,000 Miles without a single repair

ROAD DELAYS IMPOSSIBLE

The best tire for municipal machines which must respond speedily to alarms. Owners of motor wagons equipped with pneumatic and solid tires will obtain **Greater Tire Mileage and Economy** by using

DAYTON AIRLESS TIRES

The great speed at which solid-tire equipped, light capacity motor wagons are run, causes destructive vibration to motor, transmission and other moving parts, thereby **increasing** repair bills, **shortening** the life of the vehicle, **which means high depreciation,** and makes a motor wagon less attractive as an investment.

The Test of Fire-Engine Wear and Strain

has triumphantly proved The Dayton Airless Tire supreme in every feature—most efficient for every motoring requirement. The American-La France Fire Engine Co., manufacturers of 75% of all fire engines used in the United States, have adopted Dayton Airless Tires for all their Auto Fire Fighting Apparatus. This was the result of most exhaustive and critical tests by their own and other expert engineers and practical fire-fighters. To get to destination without ever the possibility of a moment's delay; to stand the wear and tear of going at terrific speed; for highest degree of protection to sensitive and complicated machinery; for lowest upkeep cost; for best service in every particular—the Dayton Airless Tires scored in these all-embracing tests far above every other tire known.

Insist on Dayton Airless Tires for Your Car

Do your own thinking and put the proof up to us. You will no longer waste your money on makeshifts, tire extras—and bearing all the other burdens thrown on you by tire troubles. Investigate these absolutely trouble-proof Airless tires—and you will find that they give you every desirable tire-quality.

Dayton Airless Tires are made in Special for Electrics—also for any kind of Motor Truck service. Fit all Standard Clincher and Universal Q. D. rims.

COPY

AMERICAN LA FRANCE FIRE ENGINE CO.
Elmira, N. Y.
Feb. 19,1912.

Dayton Rubber Mfg. Co.,
Dayton, Ohio.

Gentlemen:

It may be of interest for you to know that after making a series of practical tests of your Airless Tires, we have adopted same as the standard equipment for our power driven apparatus.

We feel much gratified over the tests we have made as we believe we have now solved the tire problem for fire apparatus.

The special tire, which you are building for us on our specification in two sizes; one for our 6-cylinder and the other for our heavier six-cylinder apparatus, allow running our cars at maximum speeds of 50 or more miles per hour without the serious hold-up of puncture or the positively dangerous result of blow-out, especially if it occurs in the front wheels.

We find these tires are as resilient as pneumatic and in so far as these cars have been in actual operation in the hands of our customers, from all reports, we believe their wearing qualities will be superior to either pneumatics or solid.

We think the tire is an ideal one for fire department apparatus.

Yours very truly,

J. A. Clarke,
Pres. & Gen'l. Mgr.

JAC/s

(C O P Y.)

CITY OF SAVANNAH.

Office Fire Department.
Corner Oglethorpe Ave. & Abercorn St.

Savannah, Ga., April 6th. 1912

Mr. J. A. MacMillan,
Gen. Mgr., The Dayton Rubber Mfg. Co.,
Dayton, Ohio.

Dear Sir:

Your favor of April 3rd to hand, in reply, I beg to say that in my opinion, the Dayton Airless Tire is the best Tire on the market for Fire Apparatus. It has given the very best satisfaction in this department.

Yours truly,

Thos. Ballantyne,
Chief Engineer.

THE DAYTON RUBBER MFG. CO.

103 KISER STREET - - - - DAYTON, OHIO

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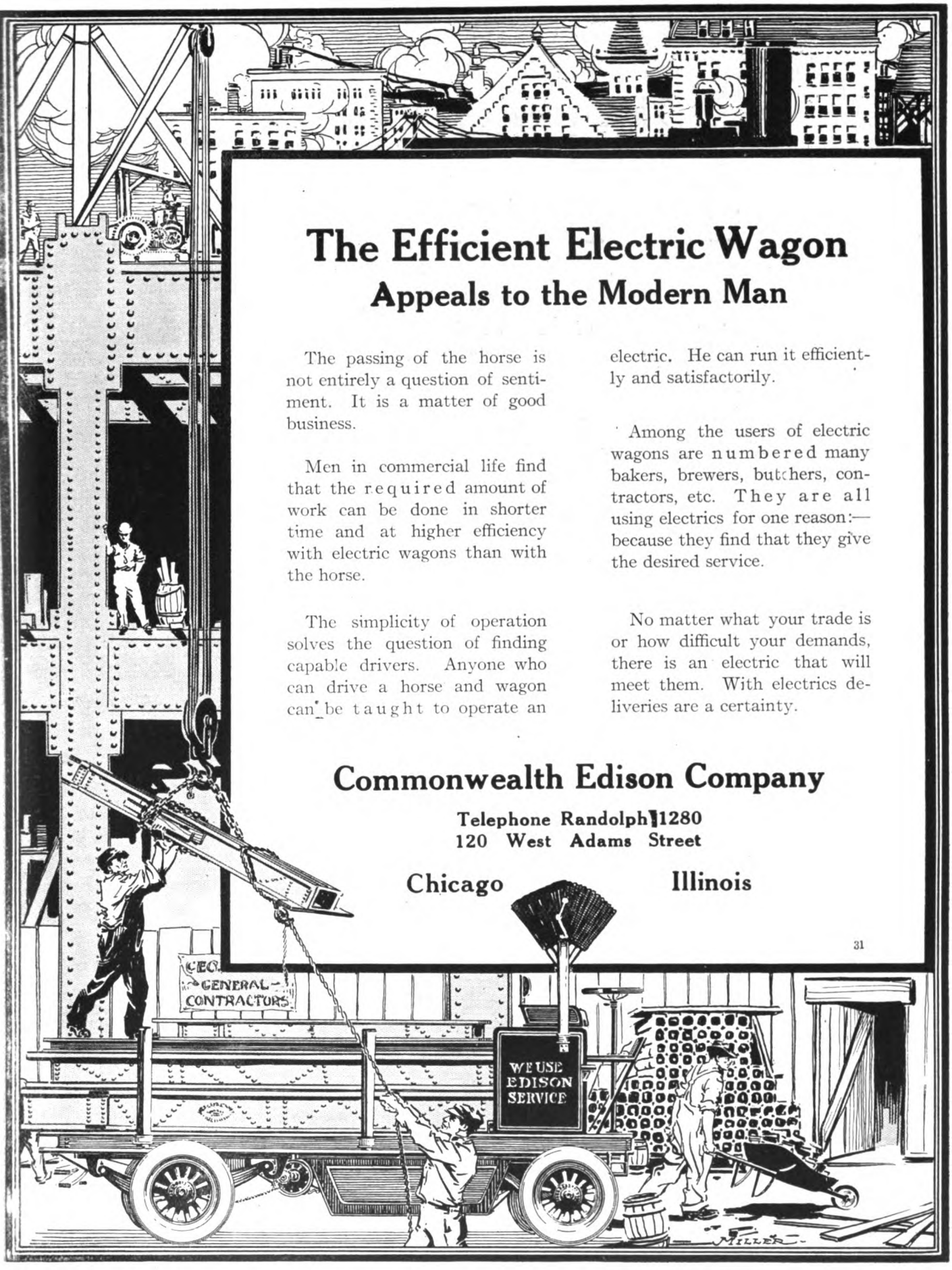

The Efficient Electric Wagon

Appeals to the Modern Man

The passing of the horse is not entirely a question of sentiment. It is a matter of good business.

Men in commercial life find that the required amount of work can be done in shorter time and at higher efficiency with electric wagons than with the horse.

The simplicity of operation solves the question of finding capable drivers. Anyone who can drive a horse and wagon can be taught to operate an electric. He can run it efficiently and satisfactorily.

Among the users of electric wagons are numbered many bakers, brewers, butchers, contractors, etc. They are all using electrics for one reason:—because they find that they give the desired service.

No matter what your trade is or how difficult your demands, there is an electric that will meet them. With electrics deliveries are a certainty.

Commonwealth Edison Company

Telephone Randolph 1280
120 West Adams Street

Chicago Illinois

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Standard Parts

For Motor Truck Builders

¶ With the exception of springs and wookwork, we manufacture a complete line of standard parts for motor trucks of 1, 2, 3, 4 and 5 ton rating.

¶ We will gladly furnish prints of chassis of models which can be built up from parts we make.

¶ Firms engaged in the production of motor wagons should not overlook the importance of investment entailed by providing both factory space and facilities for assembling. Money must be freely spent for this purpose for a number of years to come, while throughout the period the models produced will be gradually assuming final form. Whatever this minimum investment may be, it must be apparent at the outset that the only way to keep it low, and at the same time maintain factory output, is to draw upon the engineering skill and resources of the parts maker, who in order to exist must provide unusual facilities for quantity production and anticipate every change in a very sensitive market.

¶ We have the reputation for doing big things in a big way. Our large plant and our talented engineering force are wholly at your service in order to simplify your problems of production.

¶ If you need advice from a firm which has acquired experience in the making of motor truck parts—and knows the arduous duty to which they are subjected in commercial practice—consult us.

Blue Prints on Application.

Driggs-Seabury Ordnance Corporation

SHARON, PENNA.

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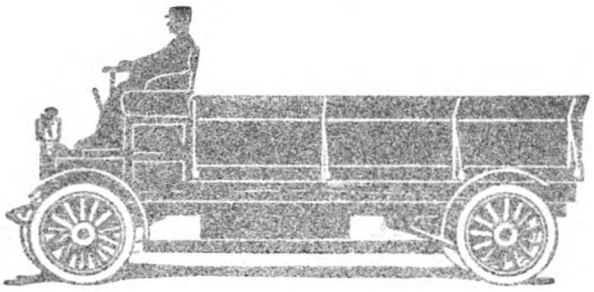


For City Traffic The Electric Truck Is Unsurpassed

THE ease with which the electric truck can be controlled and its quick acceleration make it ideal for use in congested streets.

Its power plant is the vital part. Insure satisfactory operation by equipping your truck with

Westinghouse Motors and Controllers

Back of Westinghouse vehicle equipment lies the longest record of experience in the field of electric transportation. As a result, Westinghouse vehicle motors and controllers give service that brings constant satisfaction to the truck user and increasing credit to the truck builder.

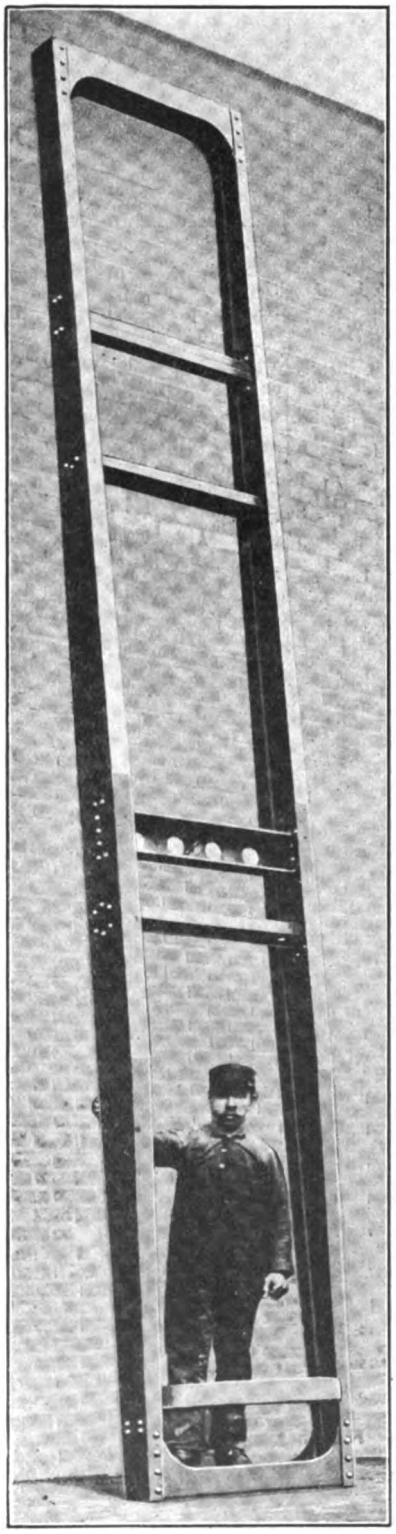
See that your truck has Westinghouse equipment. Write Dept. 56 for full information today.

Westinghouse Electric & Mfg. Company
East Pittsburgh, Pa.
Sales offices in 45 American cities

WESTINGHOUSE
the MOTOR you never have to think about

HYDRAULIC
PRESSED STEEL COMPANY
CLEVELAND, OHIO

R. B. McMULLEN, General Sales Agent
CHICAGO, ILL.



TRUCK FRAMES
½ TON TO 10 TON

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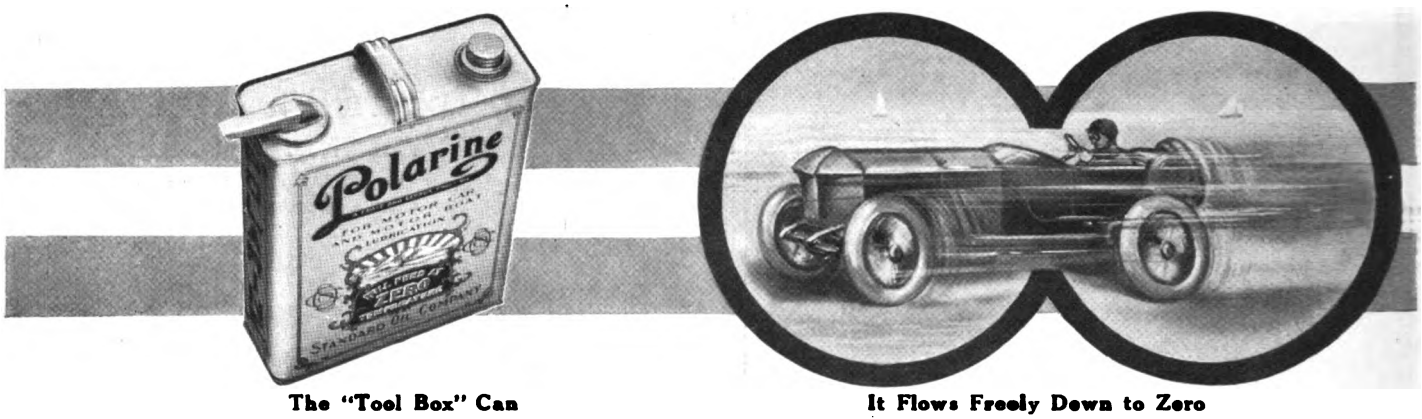
Polarine Will Stand Any Heat the Motor Develops



The "Tool Box" Can

It Flows Freely Down to Zero

You Owe This Care to Your Car

We take infinite pains and employ the greatest of care in the refining of Polarine Motor Oil. It is the "cream" of motor oils.

We begin to perfect it at the point where most oils are deemed finished.

The machinery for these *extra processes alone* cost hundreds of thousands of dollars.

We discarded lately tons of machinery simply to better our process a trifle.

But we make the best oil for every purpose. Everyone knows that. Our supremacy lies in our facilities and our resources. Polarine is our utmost for motors.

It will stand any heat that your motor will ever develop. It flows freely down to zero. It is clean and carbon-proof.

Millions of gallons a year are used.

There is no care too tedious, no expense too great, if it makes for improvement in Polarine.

Don't you think you owe this care to your car?

The Saving in Barrels

When consumption justifies, a neat saving is made buying by the barrel and half-barrel. Every motor car owner can buy more economically this way.

Polarine Lubricants

include *Fibre Grease*, for universal joints, ball and roller bearings, etc.; *Cup Grease*, a heavier grease for the same purpose, and *Transmission Lubricants*, "A" (light body), "B" (slightly heavier than "A") and "BB" (heavy body for transmissions and differentials). All are called "Polarine." **The recognized standards for motor car and motor boat lubrication.**

Polarine

A FROST AND CARBON PROOF OIL

The Standard Oil for Motors

STANDARD OIL COMPANY

(An Indiana Corporation) (3)

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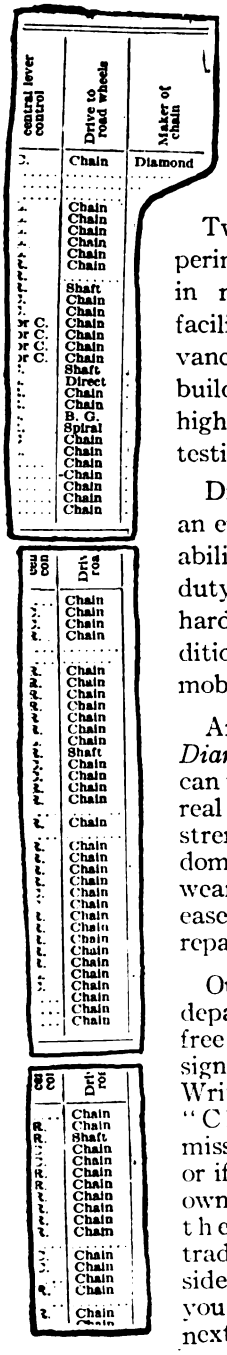
Isn't this good evidence that chain drive is best?

This list, clipped from a leading commercial vehicle paper, tabulates the drives on America's leading commercial cars as exhibited at the Madison Square Garden Show last January. It speaks for itself as to the supremacy of chain drive. It means that more chains are now used than ever and that chain drive is still growing in popularity.


Central lever control
Drive to road wheels
Maker of chain
Chain Diamond
Chain
Chain
Chain
Chain
Chain
Chain
Shaft
Chain
Chain
Chain
Chain
Chain
Chain
Shaft
Direct
Chain
Chain
B. G.
Spiral
Chain
Chain
Chain
Chain
Chain
Chain

MAY WE HAVE YOUR LAYOUT

OF BEARING INSTALLATION?

We can save you money, time and trouble, —in other words, show you a short cut to satisfactory bearing installation. ¶ The successful use of New Departures in 60 per cent of the motor cars manufactured in this country proves that the quality of this American made bearing has been well established. ¶ This fact also constitutes a good reason why you should send us your lay-out and give our engineering and sales departments an opportunity to place our proposition squarely before you. :: ::

Our engineering department is highly specialized, not only for the production of superior ball bearings, but for giving to the trade expert co-operative service. ::

THE NEW DEPARTURE MFG. CO.

BRISTOL, CONN.

1016 Ford Bldg. DETROIT, MICH.

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Save Power! Save Wear on Your Car! Save Tire Expense!

The Motz Cushion Tire offers these ECONOMIES.

It saves wasting power. That is one reason why 90% of all pleasure electric car makers have adopted Motz Cushion Tires as standard equipment. They, above all others, are sticklers for **high efficiency** tires.

Again, no light car can long withstand the bumps and jars of continuous driving unless its **mechanical parts** are protected. Motz Cushion Tires **give** that protection. Solid tires **do not.**

And, since it's unaffected by punctures and blowouts, this tire far excels treacherous pneumatics.

IT OUTWEARS SOLID RUBBER TIRES! Motz Cushion Tires are guaranteed for **TEN THOUSAND MILES—Two Years.**

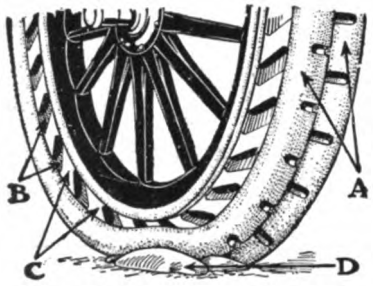
EASY-RIDING TIRES

No properly inflated pneumatic tire can be more easy riding than this. Note the "Motz" construction—double treads, which prevent skidding and distribute the weight to the sides. The undercut sides allow free action of the bridges. The slantwise, elastic bridges give and yield like the air in a pneumatic tire.

Motz Cushion Tires fit any standard clincher, universal quick detachable or demountable rim.

Where speed and not carrying capacity is the big factor Motz Cushion Tires should be used.

The Tire for Light Delivery Cars



A—Shows double, notched treads.
B—Shows undercut sides.
C—Shows slantwise bridges.
D—Shows absorbing means when passing over an obstruction.

MOTZ SOLID TIRES

For heavy duty trucks—where load, not speed, is the principal factor—we recommend Motz Solid Tires on demountable rims. Your driver can replace this tire at any time without so much as removing the wheel. Motz Solid Tires have positive fastening. Cannot wear out at base before tread has given full service.

WRITE FOR CATALOGUE—Let us tell you more about these **economy** tires. Please give make, model and duty of your car. Ask for booklet 92.

THE MOTZ TIRE AND RUBBER CO.

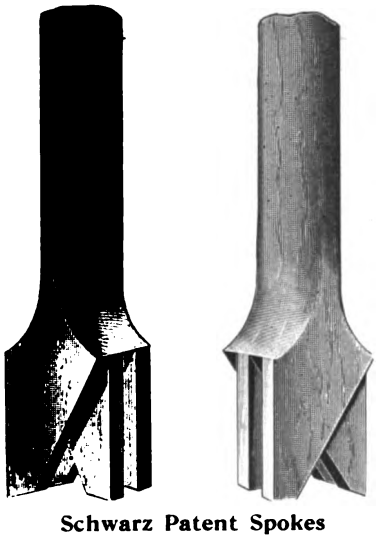
FACTORIES AND EXECUTIVE OFFICES, AKRON, OHIO

BRANCHES: 1737 Broadway, New York 2023 Michigan Ave., Chicago 2352 Euclid Ave., Cleveland, O. 999 Woodward Ave., Detroit 409 E. 15th St., Kansas City

STANDARD TIRE & RUBBER CO., 104-106 Portland St., Boston, Mass., Distributors for The New England States

Schwarz Wheels

All high class motor trucks are equipped with Schwarz Wheels because it is well understood that no others are so strong or so economical in service. Spokes at the tenon are grooved and mortised, and interlock—forming a compact and immovable assemblage. It is the only wheel with positive and evenly distributed spoke support. We are the largest producers of heavy truck wheels. Consult us. We carry a full line of S. A. E. truck wheel bands



Schwarz Patent Spokes

Schwarz Wheel Co., Frankford, Pa.

AUTOBESTINE

BEST BRAKE LINING

WOVEN STEEL HOSE & RUBBER CO.

TRENTON N.J.

Autobestine is now recognized as the very best lining on the market by the leading axle and auto manufacturers. It is uniform in thickness, size and wearing quality, and maintains its wonderful coefficient friction until worn down to the last sixteenth of an inch. It is the only brake lining that holds its customers year after year. The following well known axle and automobile manufacturers use it:

Timken-Detroit Axle Co.
Cadillac Motor Car Co.
Pullman Motor Car Co
Mercer Auto Co.
Alden-Sampson Co.
Pope Manufacturing Co.
Cole Motor Car Co.
F. B. Stearns Co.
Lewis Axle & Spring Co.
Standard Roller Bearing Co.
E. R. Thomas Motor Co.
The Autocar Co.
Speedwell Motor Car Co.
Russell Motor Car Co.

And many others.

Costs no more than inferior linings. Simply insist that your dealer gives you

AUTOBESTINE

Beware of cheap imitations using similar names.

Send for descriptive circular

WOVEN STEEL HOSE & RUBBER CO., Trenton, N. J.

NATIONAL SALES CORPORATION

Factory Sales Manager

NEW YORK 250 W. 54th St. CHICAGO 1436 Michigan Ave. DETROIT 844 Woodward Ave.

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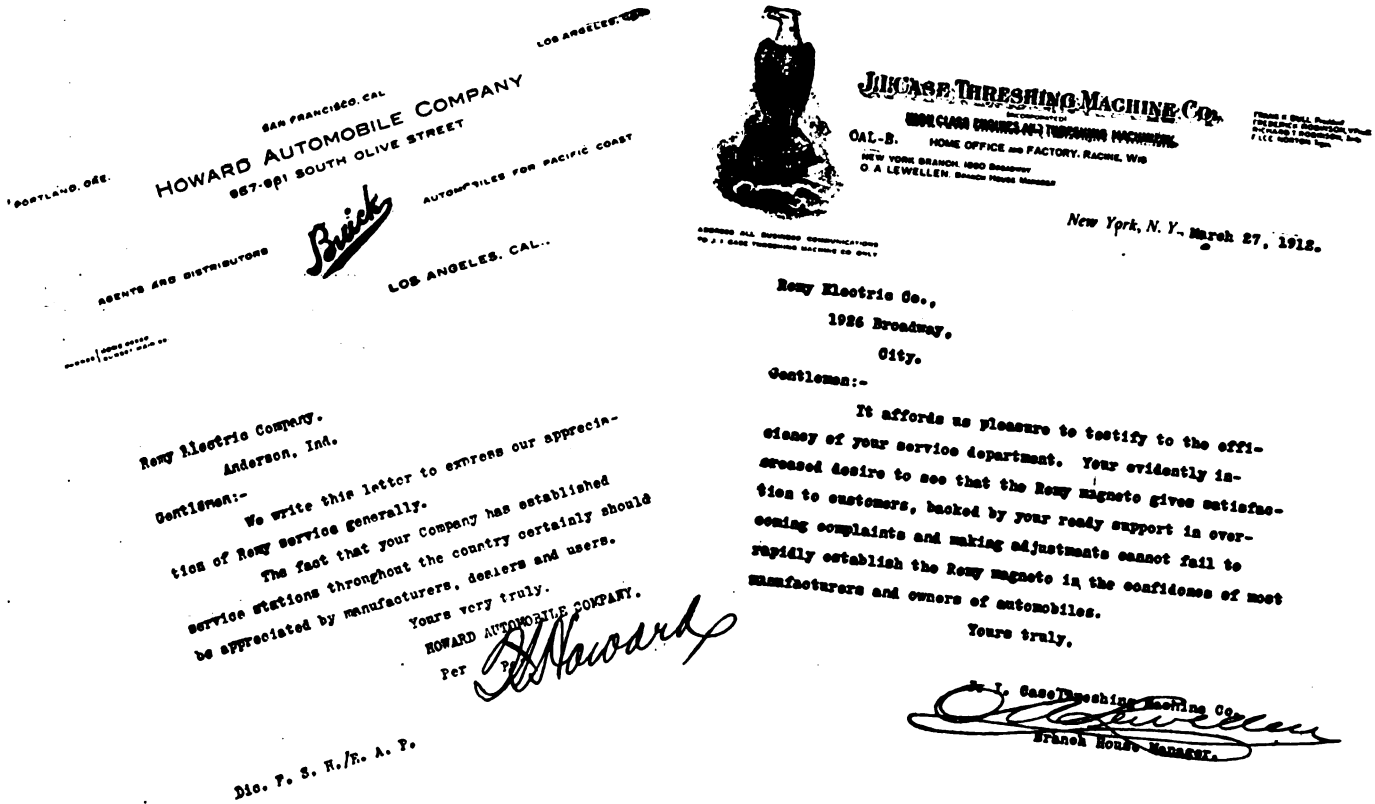
Manufacturers and Dealers

What Does Service Like This Mean to You

?



HOWARD AUTOMOBILE COMPANY
857-861 SOUTH OLIVE STREET
LOS ANGELES, CAL.

Buick
AUTOMOBILES FOR PACIFIC COAST
AGENTS AND DISTRIBUTORS

Remy Electric Company.
Anderson, Ind.

Gentlemen:-

We write this letter to express our appreciation of Remy service generally.

The fact that your Company has established service stations throughout the country certainly should be appreciated by manufacturers, dealers and users.

Yours very truly.
HOWARD AUTOMOBILE COMPANY.
Per

Dic. F. S. H./E. A. P.

J.I. CASE THRESHING MACHINE CO.
CAL-B. HOME OFFICE and FACTORY, RACINE, WIS
NEW YORK BRANCH, 1000 BROADWAY
O. A. LEWELLEN, Branch House Manager

New York, N. Y., March 27, 1912.

Remy Electric Co.,
1926 Broadway,
City.

Gentlemen:-

It affords us pleasure to testify to the efficiency of your service department. Your evidently increased desire to see that the Remy magneto gives satisfaction to customers, backed by your ready support in overcoming complaints and making adjustments cannot fail to rapidly establish the Remy magneto in the confidence of most manufacturers and owners of automobiles.

Yours truly,

J. I. Case Threshing Machine Co.
Branch House Manager.

Did you ever hear of Ignition Service before the Remy Electric Company created it?

Are you taking advantage of this Remy Service, making it a valuable part of your complete car service?
Let us tell you more about the The Best Magneto and Real Magneto Service.

Factories and General Offices at Anderson, Ind.

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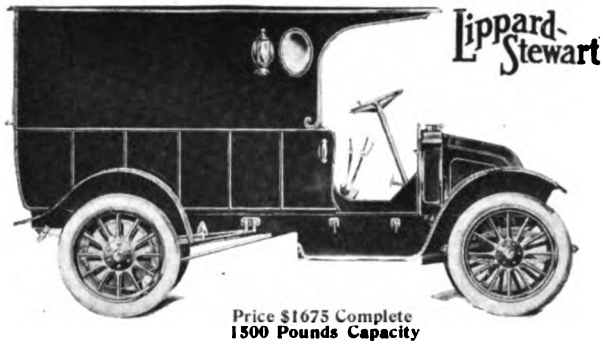


Price $1675 Complete
1500 Pounds Capacity

Note These Selling Points on the

Lippard-Stewart

In this, and subsequent advertisements, we shall give some of the selling points about the Lippard-Stewart delivery car —features that make this car a good buy for the customer—and a good selling proposition for the dealer.

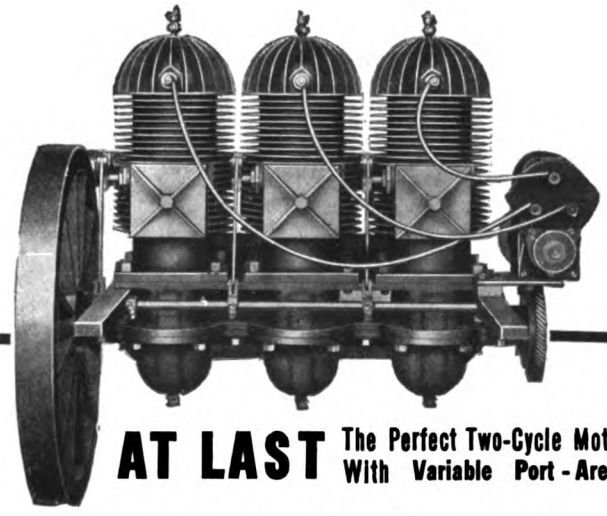
I. **Small Motor.** We use a small motor, 22 h. p., and get our weight-moving ability by means of a large gear reduction (5 to 1) at the rear axle. The small motor has three advantages:—
(1) Consumes less gasoline and oil. (2) Less vibration.
(3) Speed cut down by design.

II. **Unnecessary Parts Eliminated.** No battery, timer, battery wires, spark coil, belt-driven fan, or other trouble-making parts.

III. **Every Unit Accessible.** Every part of the Lippard-Stewart delivery car is easy to get at. That means a lot—not merely in making repairs, but by preventing the necessity for repairs. And when, in case of accident, repairs are necessary, time is saved and cost reduced by the fact that every unit is quickly removable without disturbing any other units or the load.

Write for catalog and information about the money-making possibilities of this splendid car. Desirable territory still open.

LIPPARD-STEWART MOTOR CAR CO., Buffalo, N. Y.



AT LAST The Perfect Two-Cycle Motor With Variable Port-Areas

The essential feature of Moore Motors is the increasing or decreasing of all the port-areas simultaneously (fully patented), giving flexibility of control and fuel economy.

Fixed ports, as in regular two-cycle design, mean lack of flexibility and high fuel consumption.

The result is a power plant combining two-cycle simplicity and low upkeep cost with four-cycle flexibility of control and fuel economy.

Moore Motors are backed by years of engineering experience. Send for descriptive circular.

PALMER-MOORE COMPANY
SYRACUSE, NEW YORK

"Stay Put"

That's the game in which we can give a hand. Materially, mechanically and chemically, we can help the product to stay sold and to sell more.

Possibly our stock lines may help you. The 1912 Catalogue (free) will be ready April 1st. Send your address and we will forward the book showing great increases in lines of

Superior Drop-forged,

Gas Engine Parts

—and—

Drop-forged Wrenches,

etc.

WRITE NOW! We're ready to send free blue prints, too, if necessary; or if your needs are special send your prints to us for estimate. Service considered we're cheapest Drop-forgers in the country.

J. H. WILLIAMS & CO.
Superior Drop-forgings
No. 69 Richards Street, Brooklyn, N. Y.

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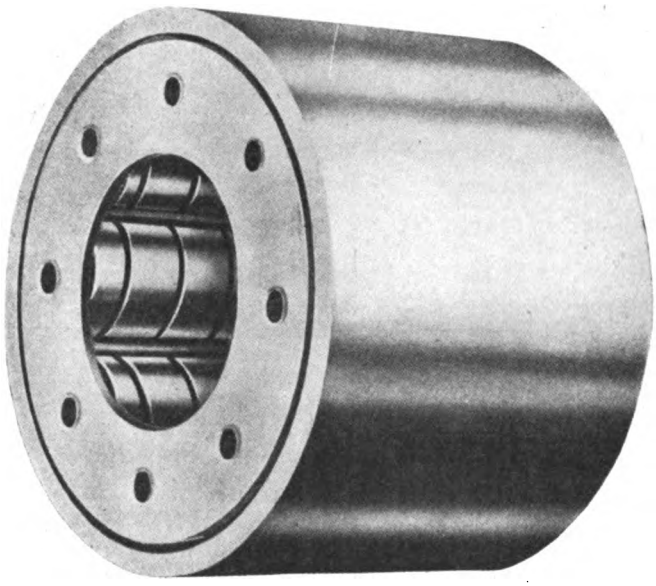

ESTIMATE, if you will, the enormous strain on the driving chains of a commercial truck when the powerful motor with its advantage of gear ratios, is pulling a load of several tons over a bad road---hauling freight under conditions as they exist about depots---and doing it day after day regardless of weather conditions.

It is only then that you can appreciate the tremendous work required of the bearings in the Transmission and Jack Shaft of such vehicles

Hyatt Roller Bearings are best suited to give long, continued service in these vital parts, because they afford line contact---are flexible, thus relieving the surrounding parts of shocks---and hollow rollers which have a self-cleaning feature that keeps the surface free from dirt and grit.

Hyatt Roller Bearings formed a regular part of the first automobiles built in America. At the present time there are millions in daily operation in every branch of motor car service.

HYATT ROLLER BEARING CO.
DETROIT, MICHIGAN

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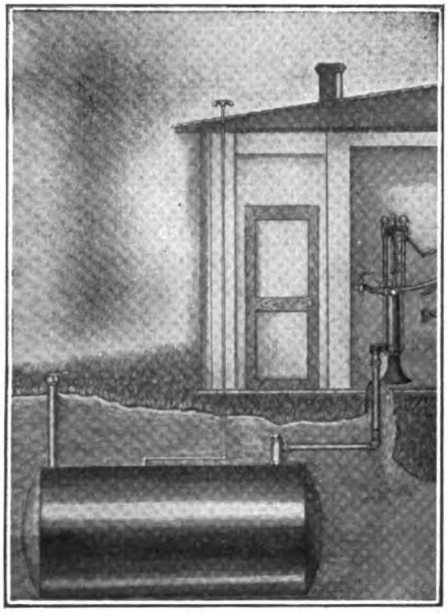

Motor Truck Owners

Are You Equipped with a

Gasolene Storage Outfit?

We manufacture Self-Measuring, Non-Measuring, Isolated, Inside Discharge and Multiple System **Gasolene Storage Outfits.**

Air Tight Tanks are constructed of 3-16 inch, or heavier, Open Hearth Steel with all seams and joints BRAZED. Every AIR TIGHT seam and joint is guaranteed to be as strong as the steel the tank is constructed of. A 100% tank.

Air Tight Outfits are listed by the National Board of Fire Underwriters

Note the effect of three men and a boy, total weight 640 lbs. on a 3-16" thick air tight shell. All air tight tanks constructed of 3-16" steel with all joints brazed.
—A SEAMLESS TANK

The Highest Quality Gasolene Storage Outfits on the Market at the Most Reasonable Prices

Good territory open for experienced Tank Salesmen.

Write today for catalog and prices

AIR TIGHT STEEL TANK CO., Pittsburgh, Pa.

CHICAGO
AIR TIGHT STEEL TANK CO.
No. 180 N. Dearborn St.

BALTIMORE
PEACE & PEACE
7 Congress St.

NEW YORK
EMPIRE TANK AND PUMP CO.
30 Church St.

BANDS
— and —
FLANGES
— for —
MOTOR TRUCKS

Perfect Workmanship
Excellent Material
Prompt Deliveries

The Standard Welding Company

CLEVELAND
NEW YORK CHICAGO DETROIT

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Joliet Electric Parcel Delivery Cars

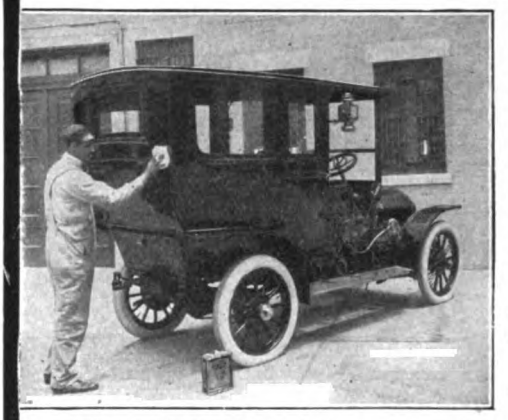
NO SMOKE—NO NOISE—NO DANGER
ALWAYS ON THE JOB

The perfect car for Banks, Jewelers, Furriers, Florists, Groceries, Laundries, Caterers, Dry Goods, Dyers and Cleaners, Confectioners, Bakers, Contractors, Tea and Coffee Stores, Clothiers, Haberdashers and Newspapers.

Good Agents can secure choice territory.

Write for complete particulars and literature.

JOLIET AUTO TRUCK CO., Joliet, Ill.



Keep Your Car Brand New

AUTOMOBILE BODIES are restored to original lustre when wiped with a soft cotton cloth dampened with

Matchless Liquid Gloss

It removes all dust, dirt, finger-marks and dinginess.
Restores lustre and sheen to polished wooden surfaces.
Preserves as well as polishes—prevents checking.
Cleans and brightens windshields.
Buy a can today.
For sale everywhere by all reputable dealers.

STANDARD OIL COMPANY
(An Indiana Corporation)

Use POLARINE—for Your Motor Car and Motor Boat

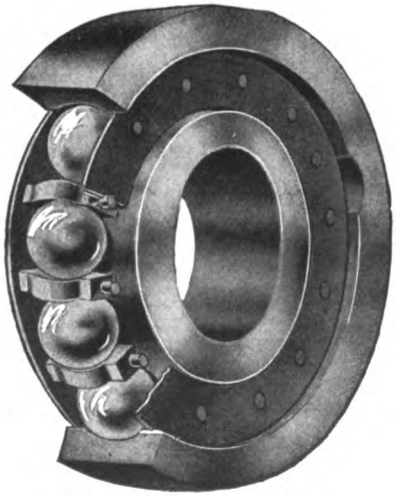
(37)

Schafer Ball Bearings

(Made in Germany)

Before you decide on your ball bearing requirements why not consider SCHAFER?

This is not a new bearing and therefore you will not be experimenting. The merits of SCHAFER ball bearings have been attained by actual service and not merely by "talk."



They have been adopted by prominent manufacturers here and abroad. This fact should convince you of the quality and efficiency of SCHAFER ball bearings.

Write for catalog and prices

BARTHEL, DALY & MILLER
Sole Importers
42 Broadway **NEW YORK**

A Sure Thing

from a strictly practical point of view—is the Veeder Hub Odometer. There is no fooling it—it will check distance traveled backward as well as forward.

You can, at any time, compare the work done by your pleasure or commercial vehicle—upkeep cost is tallied to a detail.

Neat, durable and compact, it can be easily attached. Price complete **$25.00**

At your dealers', direct from our factory or at the following agencies:

T. H. Cranston & Co., 56 E. Randolph Street Chicago, Ill.

L. H. & B. I. Bill, 543 Golden Gate Avenue San Francisco, Cal.

The Rubber Tire Wheel Company, Montreal, Quebec, Toronto, Winnepeg and Vancouver

The Veeder Manufacturing Company
C. H. VEEDER, President D. J. POST, Treasurer
H. W. LESTER, Secretary
HARTFORD, CONN.

Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Small Die Castings

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THE "SPICER"

universal joint was the pioneer for shaft driven automobiles—either pleasure or commercial cars.

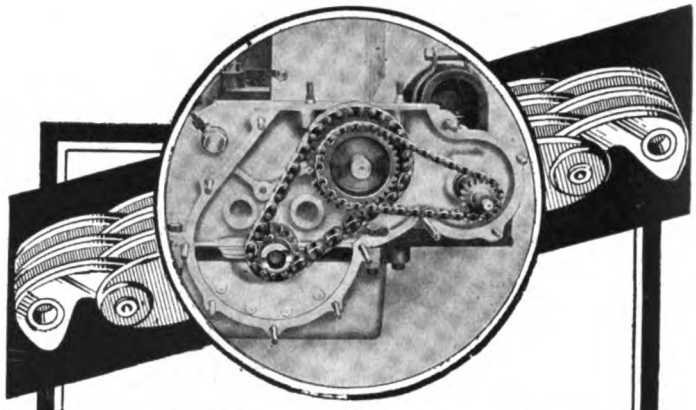
Consult Our Representatives:

K. FRANKLIN PETERSON,
122 So. Michigan Boulevard,
Chicago

THOS. J. WETZEL,
17 West 42d Street,
New York

L. D. BOLTON,
1810 Ford Building,
Detroit

Special Foreign Representative:
BENJ. WHITTAKER, 21 State Street, New York



The Highest Standard of Efficiency
in magneto, camshaft, and pump drives is reached by the application of the economical, reliable and silent

COVENTRY NOISELESS CHAINS

The precision, automatic retention of pitch and long life are a few of the facts taken into consideration by many manufacturers of the most silent, reliable, and fashionable cars who fit these chains exclusively.

The services of our experts are at your disposal.

WRITE TODAY.

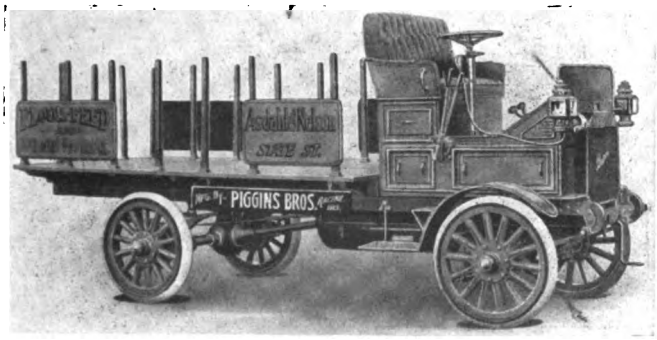
United States Representatives:
SARCO ENGINEERING CO.
114 Broad St., New York

THE PIGGINS MOTOR CAR CO.

of Racine, Wisconsin, manufacture a complete line of motor trucks from 1 to 10 tons capacity.

Simplicity and accessibility are the dominant features of our long stroke truck motor.

Also as there is no chains to break and no sprockets to wear out as our trucks have a double rear axle and are all gear driven.



Two-ton model of Piggins Motor Car Co., Racine, Wis.

Send for catalog showing complete line of models.

Choice territory open to responsible dealers.

PIGGINS MOTOR TRUCK CO.
RACINE :: :: WISCONSIN

DIXON'S CHAIN GRAPHITE No. 678

Lubricates Without Waste

Because it possesses all of the well known lubricating qualities of Dixon's celebrated flake graphite. Flake graphite stays where it is placed, can't drip or grow sticky, lessens noise, stops wear and is cleanly because it has no tendency to collect dust, dirt, grit or other injurious matter to clog and wear out chains. Dixon's Chain Graphite is readily carried about and easily applied at any time by rubbing the bar against the sprocket side of the chain. Dixon's Chain Graphite is cleanly, convenient, economical and durable. The cylindrical shaped bar, 2x8 inches, just fits the hand. Each bar weighs about one pound and is neatly encased in a cardboard carton.

D X N TRADE MARK

JOSEPH DIXON CRUCIBLE COMPANY
JERSEY-CITY NEW-JERSEY

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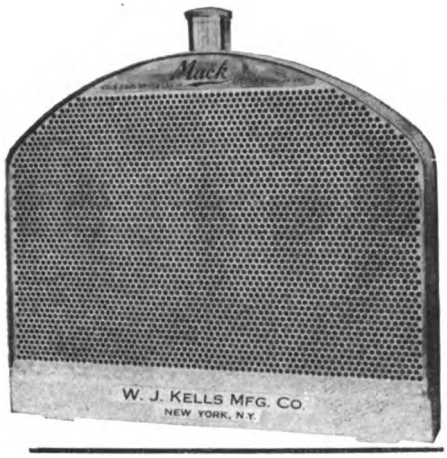
"KELLS"

The most Durable and Efficient

RADIATORS for Commercial Cars



Positively guaranteed not to leak for two years.
Used on all the **Leading Gasolene Trucks of America.**

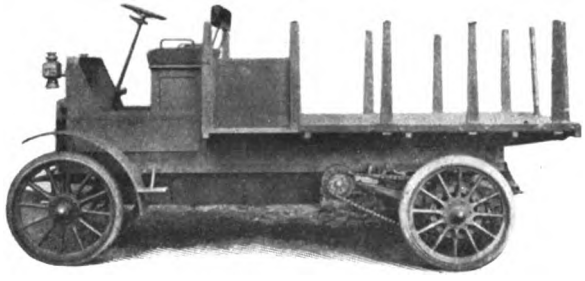
Ten Years Test Has Proven the Best.

BEWARE OF IMITATIONS.

W. J. KELLS MFG. CO.
521-25 W. 45th Street, NEW YORK CITY

THE PARK DROP FORGE COMPANY
CLEVELAND

Our newly designed 1500 lb.—2000 lb.—3000 lb. capacity motor trucks are now ready for prompt delivery to merchants, buyers and dealers.



These models are of the most modern design, being equipped with long stroke four cylinder motors especially designed for truck service. The transmission is 50% more than ordinary rating, and its parts are exceedingly heavy and rugged.

Write for illustrated catalog

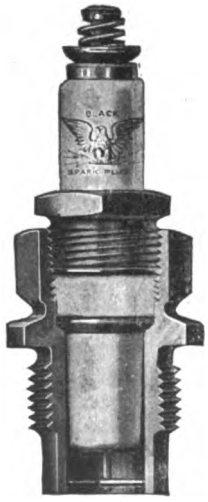
Ideal Auto Truck Company
Fort Wayne, Indiana

The Greatest Value Ever Offered

IS THE

"Black Eagle" Spark Plug at 50c

Efficiency and Quality Without Extravagance



50c now buys the best spark plug service to be had. The Spark Plug with the "patented" universal spring cap that permits the use of ANY style terminal.

The Plug with a riveted central Electrode, and two contact wires sparking on rounded surfaces, thus avoiding pitting of the wires.

Manufactured and sold by people with whom you will be pleased to do business.

Especially efficient in Motor Trucks.

The Progressive Manufacturing Co.
TORRINGTON, CONN.

Please mention the "Power Wagon" when writing to advertisers.

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WHITE MOTOR TRUCKS

THERE are more than eight hundred owners who operate from one to fifty White trucks.

The supremacy of White trucks is the natural result of superiority.

The White Company

CLEVELAND

MANUFACTURERS OF
GASOLINE MOTOR CARS, TRUCKS AND TAXICABS

One Million
BOSCH
Magnetos

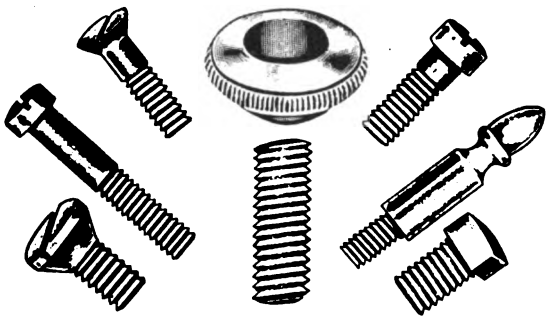
THE production of Bosch Magnetos has passed the million mark, a point no other has approached even by half. A basis of confidence, *A Reason Why* you should be careful to specify "Bosch" for your Motor Truck, and accept no other.

What is good for a million
is good for you

BOSCH MAGNETO COMPANY

223-225 West 46th Street NEW YORK

Detroit Chicago San Francisco Toronto



Small Manufacturers

Don't tie your capital up in Screw machines—turn this class of work over to us.

We can do it quicker and cheaper for you and guarantee accuracy.

We are also prepared to do all kinds of machine work, hardening, tempering, grinding, polishing, plating and enameling.

Send blue prints for estimate.

National Cycle Mfg. Co.

Bay City, Mich.

GAYLOR-ATLAS
GRIPS FOR SOLID TIRES

ARE

Efficient in service
Easily and quickly attached
Simple in construction
Self-adjusting to rims
Harmless to tires
Made of Chrome Vanadium Steel
Extremely durable
Guaranteed against defects
For single and dual type tires
Needed all the year 'round
Inexpensive.

ARE NOT

Heavy and cumbersome
Noisy
Complicated in construction
For Winter use only
Hard to attach.

A Set in the Tool Box Guarantees Your Delivery Service

CATALOGUE
ON REQUEST

Atlas Chain Co.

BUSH TERMINAL
BROOKLYN, N. Y.

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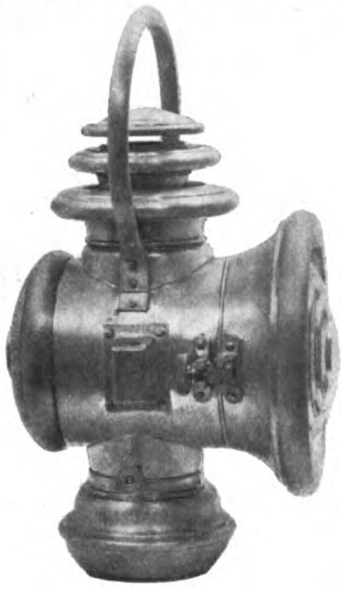
CASTLE LAMPS FOR MOTOR TRUCKS



Are built to meet hard use and give perfect satisfaction.

THE CASTLE LAMP CO.
AMESBURY, MASS.

Adams Trucks
"Deliver the Goods"

Made in two capacities, one ton and one and one-half ton. The Adams embodies the very latest foreign design and construction, resulting in a truck which proves in actual service its fitness for the job.

Descriptive Catalogue for the asking.
Agents write for our Special Proposition.

THE ADAMS BROS. CO.
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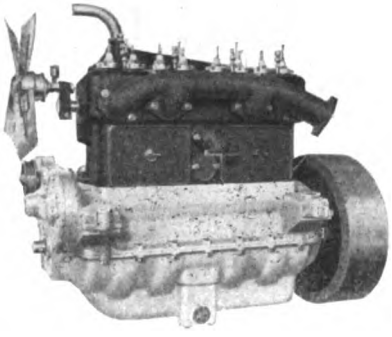
NEW
"CONTINENTAL" COMMERCIAL MOTORS

Designed for Heavy Work.

Manufactured in one-ton to seven-ton capacity.



They contain all the important, up-to-date features, such as long stroke, large valves, heavy bearings, perfect lubricating system, enclosed valve mechanism, etc.

Furnished as independent motors or in complete Unit Power Plants.

Let this noted motor make a reputation for your truck.

Write for specifications, prices and terms.

CONTINENTAL MOTOR MFG. CO.
MUSKEGON, MICH.

FACTORY REPRESENTATIVES:

K. F. Peterson,
122 S. Michigan Blvd.,
Chicago, Ill.

L. D. Bolton,
1810 Ford Building,
Detroit, Mich.

MERCURY TRUCKS

When the mercury is up, the **Mercury** runs.

When the mercury is down, the **Mercury** runs.

Heat, cold, rain, snow, sleet, ice, the **Mercury** never changes.

The Commercial Motor Wagon that never varies.

Manufactured—not assembled.

The Mercury Manufacturing Co.
4108 S. HALSTED ST., CHICAGO, ILLINOIS

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ONLY PERFECT WHEELS AND BODIES

ARE PRODUCED ON

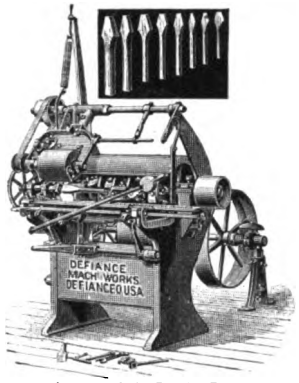
DEFIANCE

Heavy Auto-Truck Wheel Machinery

There are no variations whatever in any wheels turned out on DEFIANCE machines. They are perfect in size, shape and finish and run absolutely true. No extra hand work to be done after leaving our machines.

We have equipped all of the large motor-vehicle builders and they are turning out the highest grade product.

Write us TODAY for full particulars and prices.

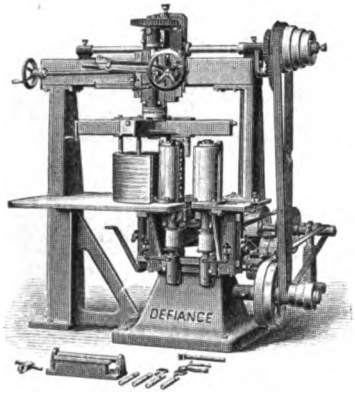


Automobile Spoke Lathe

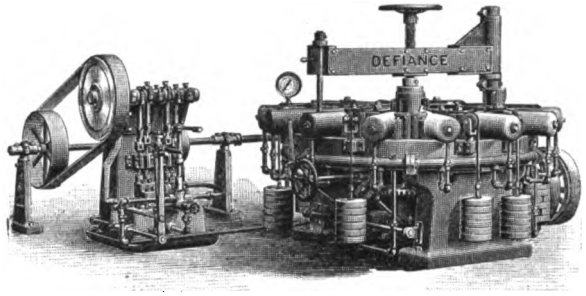
Auto Wheel Finishing Stand

The Defiance Machine Works

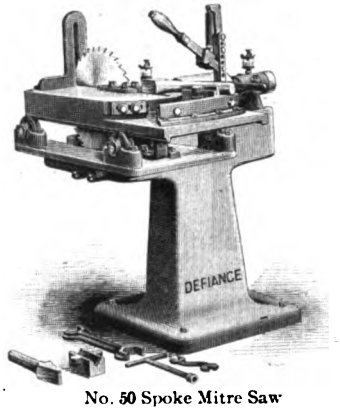
435 Perry Street, DEFIANCE, OHIO



Heavy Auto Truck Rim Planer

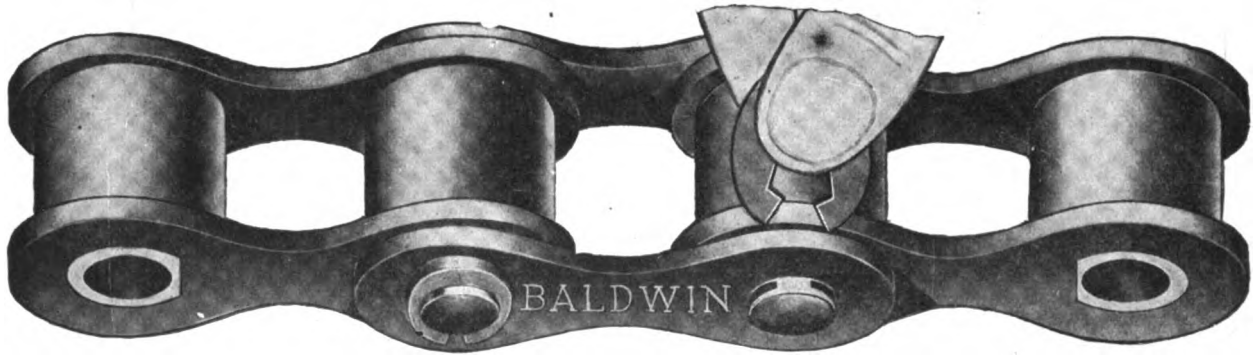


No. 200 Heavy Auto Truck Wheel Assembler



No. 50 Spoke Mitre Saw

BALDWIN CHAINS



Baldwin chains are made both riveted and detachable in all sizes, and great variety, for commercial cars. Our detachable chain is especially desirable. The high quality of Baldwin chains is demonstrated by its patrons. Long experience has enabled us to develop high quality of chains by careful attention to the selection of stock, and to the design. We make the strongest and lightest chains on the market. These features are desirable to conserve the chains in the thrashing and the wear and tear they get over rough pavements and roads. Send for circulars and samples.

SPROCKETS

We are prepared to quote you interesting prices on special sets of sprockets, or sprockets in large quantities.

BALDWIN CHAIN & MFG. CO.

WORCESTER, MASS.

AGENTS { H. V. GREENWOOD, 150 Michigan Ave., Chicago, Ill.
C. J. IVEN, Rochester, N. Y.
M. A. BRYTE, 788 Mission St., San Francisco Cal.

Please mention the "Power Wagon" when writing to advertisers.

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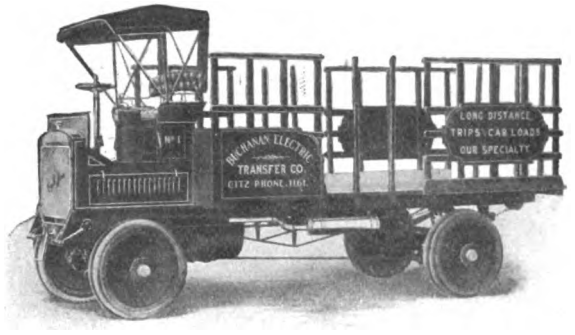


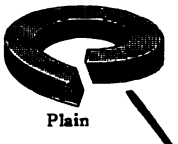
BUILT in Two and Three Axle equipments. 3½ to 10 ton capacities. Especially adapted for long hauls and difficult road problems.

Let us send you literature and full information

Couple-Gear Freight-Wheel Company, 550 Buchanan Street, Grand Rapids, Michigan

THE

POSITIVE



Lock Washer

Made in all sizes and weights for Automobile purposes and Trucks or Power Wagons. Can be used thinner than any other lock washer—effective, no matter how thin. One lock under the nut and head can be used if so desired. Exhaustive tests, covering a period of nearly 20 years on railroad track, drop presses, Automobiles and machinery subject to vibration, have proven its superiority over every nut lock manufactured. *Write for samples and prices.*

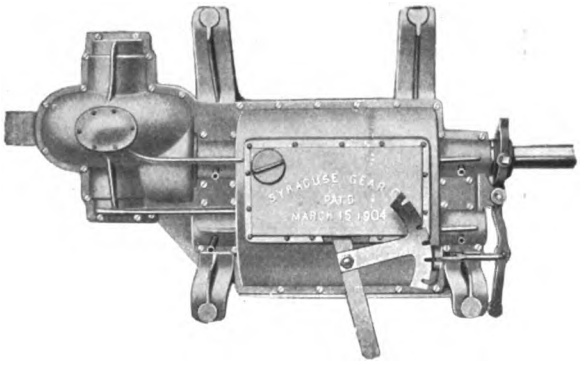
The original and genuine Positive Lock Washers are made *only* by the

POSITIVE LOCK WASHER CO.
NEWARK, N. J.

Syracuse Transmissions

PATENTED MARCH, 1904

Progressive and Selective Type Commercial Success for 10 Years



No. 4 Side Chain Drive, 2 ton Trucks
No 5 Side Chain Drive, 3-5 ton Trucks
No. 6 Side Chain Drive, 6-10 ton Trucks
No. 80 and No. 15, Shaft Drive.
Also Planetary gears.

SYRACUSE GEAR CO., Syracuse, N. Y.

A CARBURETOR Absolutely Fool-Proof

THE Zenith Carburetor Company offers truck manufacturers and owners a carburetor proved by five years experience in Europe—absolutely fool-proof and without a single adjustment.

A trial will convince you of its power, its economy and its remarkable efficiency.

Zenith Carburetor Co.
270 Jefferson Avenue DETROIT, MICH.

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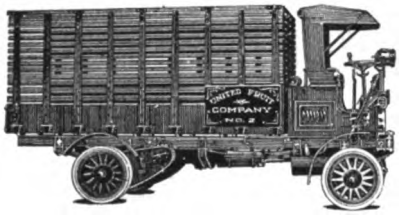
The Faithful Servants of Industrial Transportation.

"Recognized as America's Highest Standard Ever Since the Beginning of the Industry."

Send for Catalog of Commercial or Fire Vehicles.



KNOX AUTOMOBILE CO.

SPRINGFIELD, MASS.

NEW YORK **Branches:** **CHICAGO**

More Efficiency with Greatly Reduced Charges

Gramm efficiency does not demand higher prices, however willing you may be to pay them in order to secure Gramm service.

Stolberg & Parks, furniture dealers of Toledo, have been for three years users of Gramm Trucks. In reply to a recent inquiry they wrote as follows:

"The entire operating expense and up-keep of a two-ton Gramm is less than one-half the up-keep of a two-horse team, and will do double the work on long hauls.

"The Gramm is the popular gas truck in Toledo, and one that we could recommend to be beyond the experimental stage."

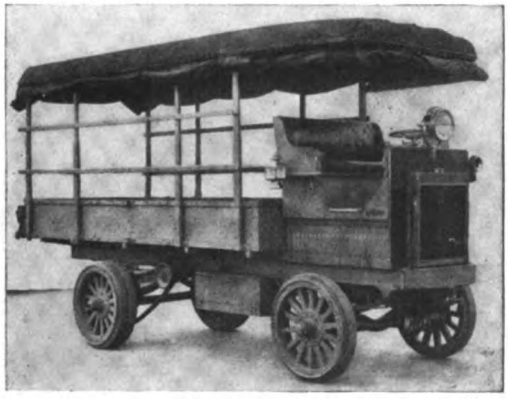
This unsolicited testimonial, which was sent to a third party, gives precisely the facts that the man who is considering the purchase of a truck wishes to know.

The Gramm is built in 1-Ton, 2-Ton, 3-Ton and 5-Ton models. Special bodies planned and built to give the best and most economical service.

The Gramm Motor Truck Co.

111 SO. LIMA STREET, - - LIMA, OHIO

Knickerbocker Trucks



Any mechanical part may be removed on the road in a half hour or less without unloading or dismantling the truck.

Write for Catalogue.

Knickerbocker Motor Truck Mfg. Co.

151st Street and River Avenue

NEW YORK

HARRISON

The Tubular Truck Radiator shown below is one of the many styles we manufacture and they are all giving universal satisfaction under the severe conditions incident to this service. In fact, we have yet to hear of a failure, either as to efficiency or stability

This stability is due to a minimum of PARTS AND SOLDERED CONNECTIONS—we have one seam for each seven tube element.

It is also due to use of the very best material and workmanship.

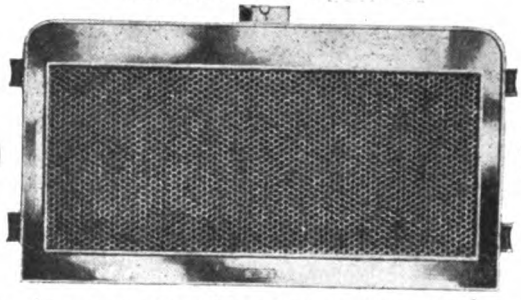
The efficiency is owing to free circulation of water, and high impingement of air

We also manufacture cellular and tubular radiators for pleasure cars.

THE HARRISON RADIATOR CO.

LOCKPORT, N. Y.

Detroit Office, 1422 Ford Building,



Send us your blueprints and specifications and we will be pleased to estimate on your requirements.

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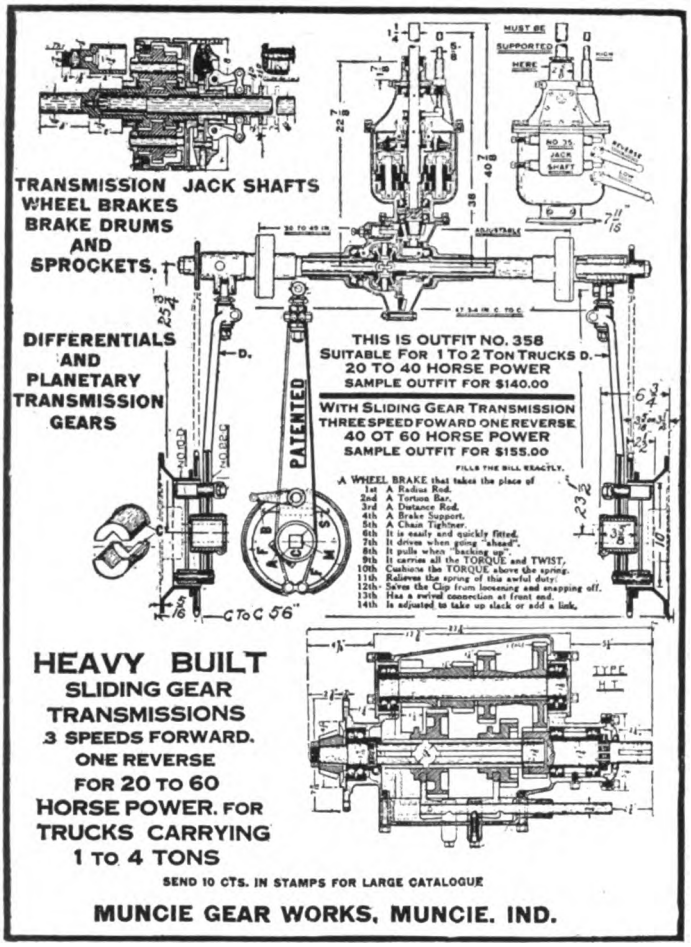
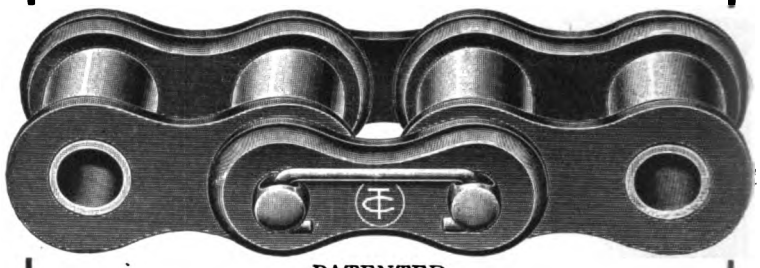


HEAVY BUILT
SLIDING GEAR
TRANSMISSIONS
3 SPEEDS FORWARD.
ONE REVERSE
FOR 20 TO 60
HORSE POWER. FOR
TRUCKS CARRYING
1 TO 4 TONS

SEND 10 CTS. IN STAMPS FOR LARGE CATALOGUE

MUNCIE GEAR WORKS, MUNCIE. IND.

Culver-Taylor Detachable Chain



PATENTED

Designed Especially for MOTOR TRUCKS

The Notch Does It

A Detachable Chain with links that will not work loose. TRY THEM. The result will surprise you.

Culver-Taylor Chain Works

142 Madison Avenue, DETROIT, MICH.

SPLITDORF MAGNETO

"Always There"

With the installation of SPLITDORF IGNITION —SPLITDORF SERVICE is at your command.

And SPLITDORF SERVICE is courteous and thorough and practical—from the factory and main distributing center in New York, through every branch office and other selling artery all over the country, to the crowning detail of personal road men.

And these road men—experts in their calling and human in their intelligence—have one duty to perform and that duty is to give their services to every SPLITDORF user for the asking.

If there is any "kink" in your ignition system—if it is not "right up to the mark" let SPLITDORF SERVICE straighten it out for you.

Your satisfaction is our satisfaction; so don't be afraid to call upon us.

Write for Catalog

C. F. SPLITDORF

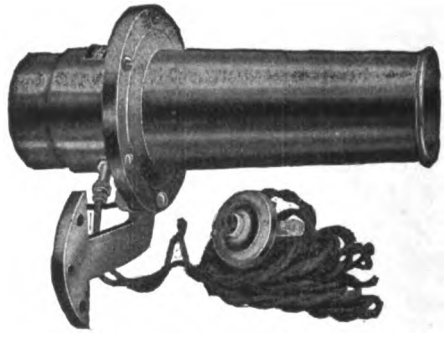
Walton Ave. aud 138th St.

Branch, 1679 Broadway NEW YORK

CHICAGO BOSTON LOS ANGELES
DETROIT KANSAS CITY SAN FRANCISCO

NEWTONE

The Mile Away Electric
MOTOR HORN



Torpedo Type

Pat. Sept. 5, 1911

PRICE

$20.00

Including Button and Cable

The Most Perfect Warning Device on the Market

The increased demand for the Newtone Motor Horn is due to its absolute efficiency in warning, and economy in operation.

The motor with Hess-Bright Ball Bearings and imported self-lubricating brushes, eliminate all oiling and cleaning.

The chief engineers of three leading American automobile manufacturers after a "Break-down" test, state that, in their opinion, the Newtone Horn is the best warning signal made.

Let Us Send One On Approval

Automobile Supply Mfg. Co.

220 Taaffe Place, Near Dekalb Avenue, **Brooklyn**

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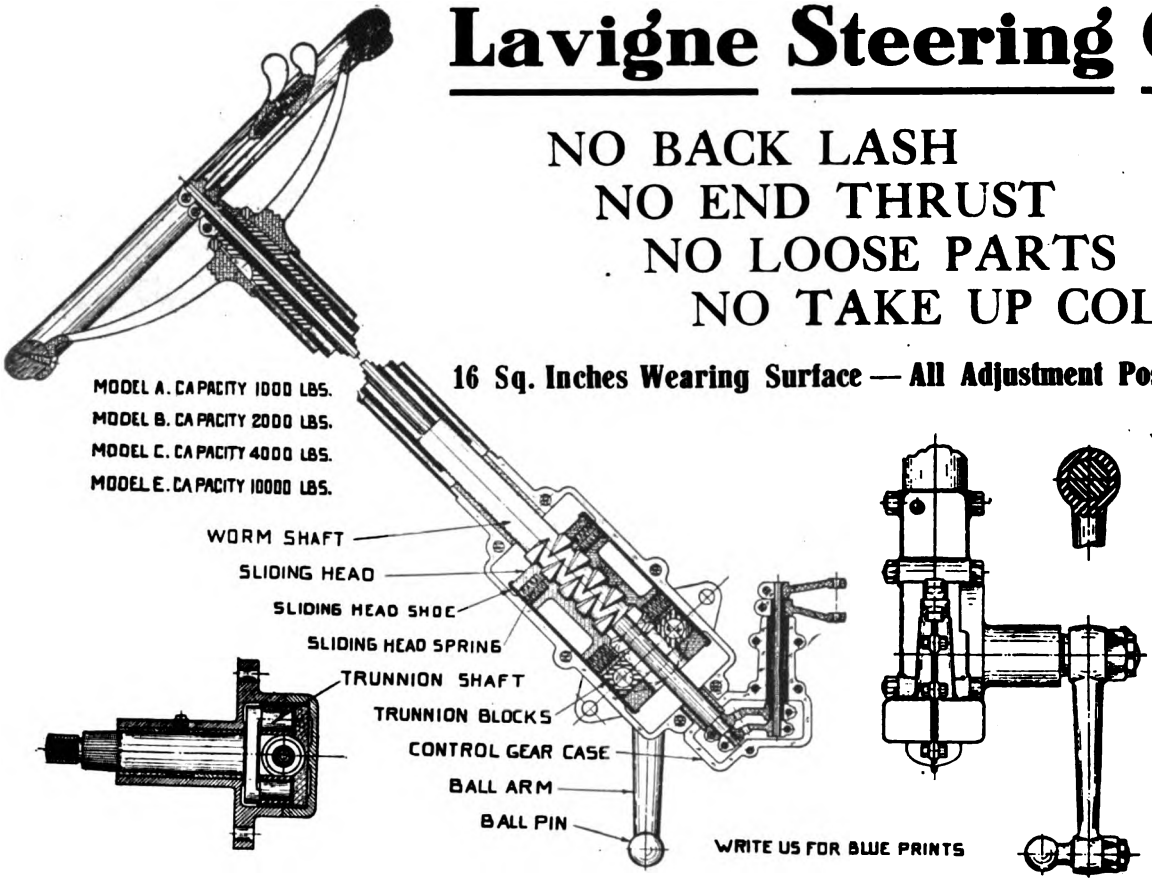
Lavigne Steering Gears

NO BACK LASH
NO END THRUST
NO LOOSE PARTS
NO TAKE UP COLLARS

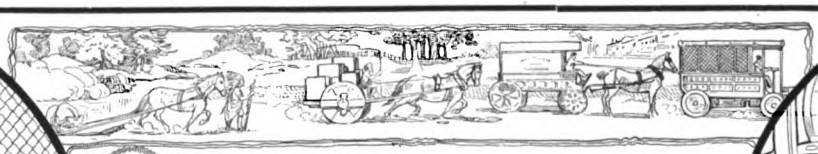
16 Sq. Inches Wearing Surface — All Adjustment Positively Automatic



LAVIGNE GEAR CO.

Detroit, Mich.

Factories:
Detroit, Mich.
Corliss, Wis.



What is YOUR Delivery Problem?

Consult Our Service Bureau.

Motor Service Bureau,
New York City

Gentlemen:

We are interested in a Motor that will be the kind for our particular delivery. We collect and deliver at the same time, necessitating many stops in same block; we have in the spring heavy but level streets, very muddy in the outskirts, loads never amount to more than 600 lbs without driver. Never have been able to get actual figures from any one who handles same line of business, nor have we been able to find out which is the best, chain or shaft drive, hard tires or pneumatic, whether a good size power plant with speed or small with say 20 miles per hour, a two cycle or four, etc. We run five wagons with 8 horses; in a short time all will have to be renewed and want to get posted before that time.

Thanking you for any information or suggestions, we are

Yours truly

We gladly give information free of charge.

The Review of Reviews Magazine

13 Astor Place, New York City

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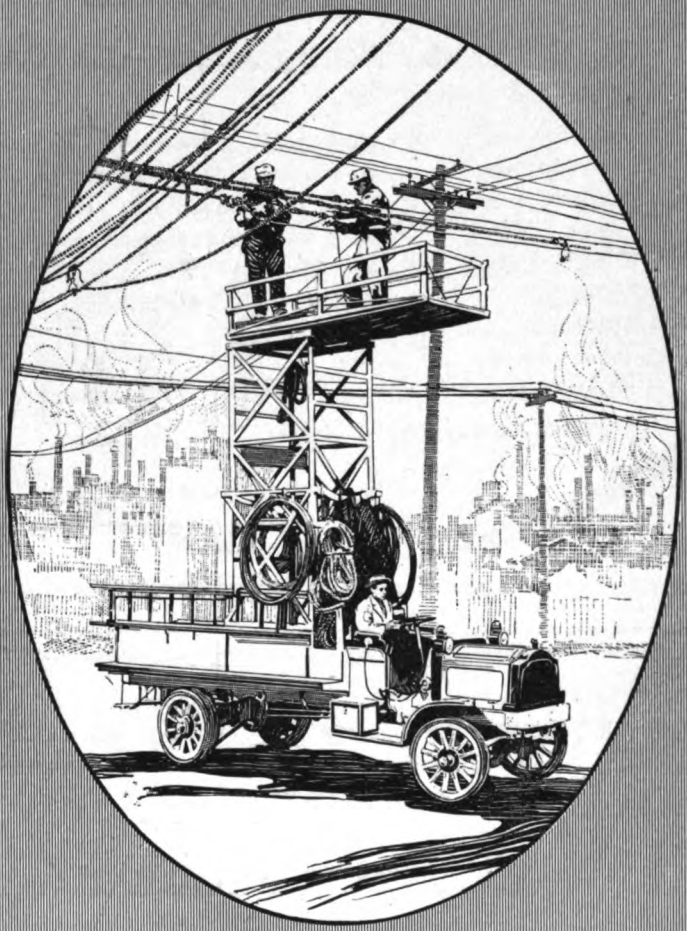
The Packard



Used in 154
lines of trade

Ask the man who owns one

Packard Motor Car Company, Detroit

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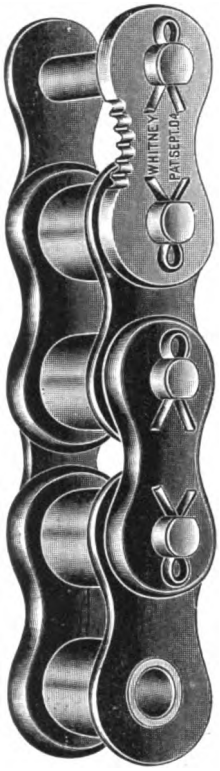


WHITNEY

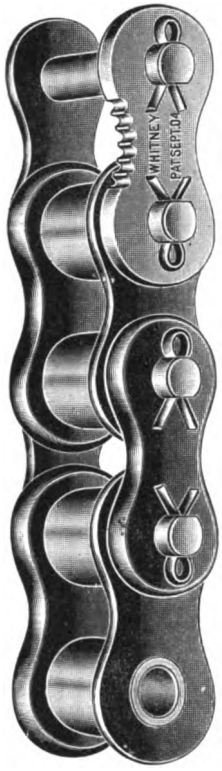
THE MOST PRACTICAL CHAIN FOR MOTOR TRUCKS

Because the "Whitney" Cotter Detachable Chain can be easily separated at any link and lengthened, shortened, or repaired without the use of any special tool. This is of great advantage to truck builders, owners, and drivers.

To have your truck equipped with "Whitney" Chains means greater mileage, because they are made by specialists, in a factory especially equipped for the making, and backed by years of experience. "Whitney" Chains are made from material chosen for quality regardless of cost and all the care taken in their manufacture makes them stand foremost. When making replacements try a "Whitney" and get acquainted with its merits.

"Whitney" Chains Are Built For Strains

THE WHITNEY MFG. COMPANY
Hartford, Connecticut



Detroit Oilers Prevent Waste

The Detroit Mechanical Force Feed Oiler gives **sure** lubrication under every condition.

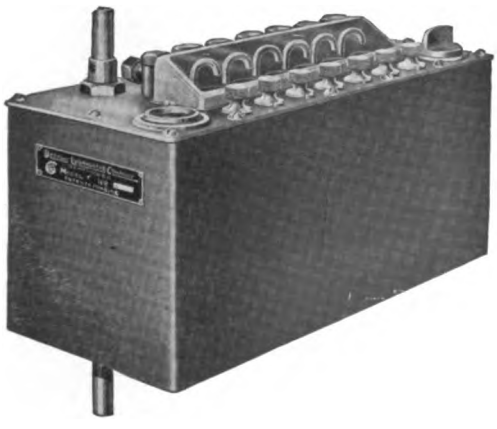
In connection with splash systems the Detroit maintains **exactly** the correct level at all times. At every changing speed the right amount of fresh, clean oil is supplied as fast as the oil is used up.

With the oil level in the crank case maintained at the proper height there is no opportunity for either under-lubrication or over-lubrication.

By preventing over-lubrication the Detroit Mechanical Force Feed Oiler eliminates **waste** of oil and its results—carbonized cylinders, pitted valves, fouled plugs and smoke at the exhaust.

Once properly regulated the Detroit Oiler takes care of itself and needs only an occasional replenishment of the oil supply in the reservoir.

The Detroit Force Feed Oiler gives a **complete** lubricating system for **every** kind of gas engine. It is efficient, economical and sure.



The Detroit Force Feed Oiler has no checks

The Detroit has no ball checks or check valves, springs or other complicated mechanism to go out of order and clog up. It guards against the damage, waste and expense resulting from faulty lubrication. It makes for guaranteed service.

Detroit Force Feed Oilers are made in capacities from two pints to five gallons, with from one to thirty feeds—pulley, rachet, sprocket or gear drive.

They are furnished as standard equipment by many manufacturers of high grade commercial trucks.

The Detroit catalog tells all about the advantages in design and construction which have made the "Detroit" the standard gas engine lubricator.

Write today for catalog P-67 and full information, stating in what kind of truck you are interested.

DETROIT LUBRICATOR COMPANY.
DETROIT, U. S. A.
Largest manufacturers of lubricating devices in the world.

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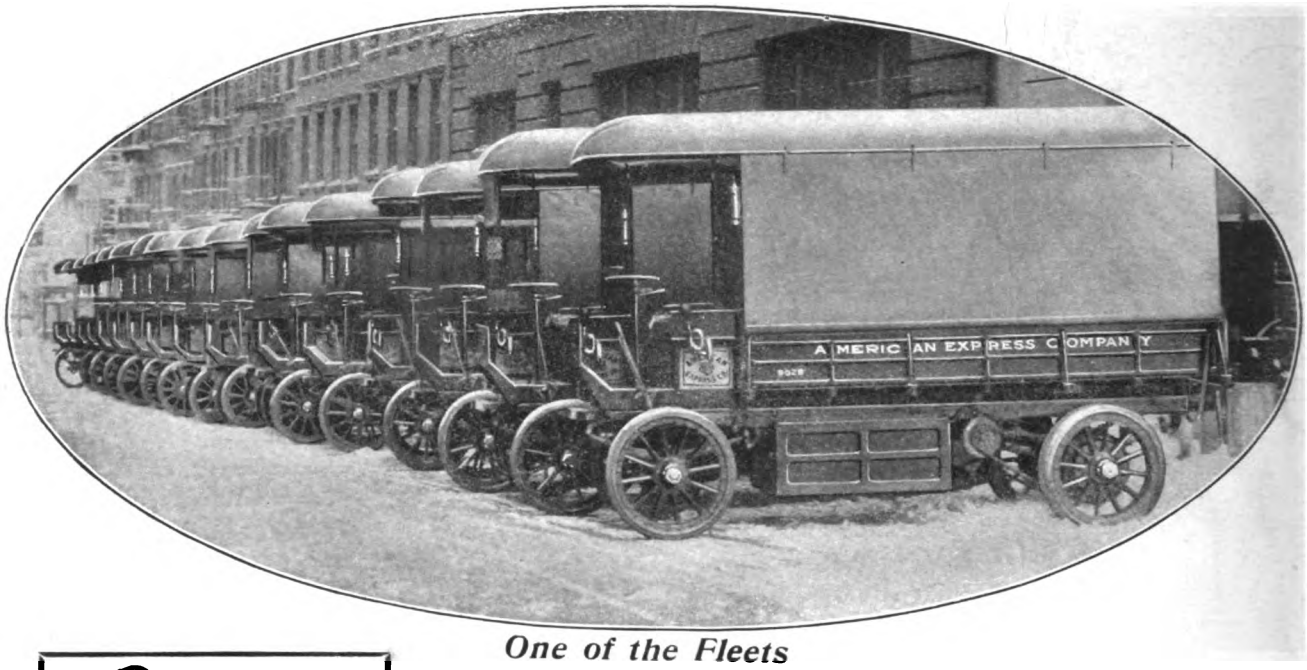

One of the Fleets

Baker Electrics

COMMERCIAL CARS

Large Transportation Interest Buys —80— Baker Electric Trucks

Fleets of Bakers have been ordered for express service during the past year, based entirely on their superior construction and efficiency in city work. A three year test by transportation experts resulted in selecting the highest grade electric vehicle made in this country—the Baker.

The Unusual Efficiency of the Baker Chassis

is due to correct design and a high degree of engineering refinement, as instanced by such details as imported annular ball bearings on the countershaft; hardened and ground spring shackle bolts; Renold silent chain running in oil, dust proof; hardened and ground pins, bronze bushed, for articulating joints; exact machining of parts, and a number of other exclusive features of superior design.

The Baker Motor-Vehicle Company **Commercial Car Department**

69 West 80th Street, Cleveland, Ohio **Dealers in Leading Cities**

Oldest and Largest Manufacturers of Electric Vehicles in the World

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No. 91. Chicago, June, 1912. Price 20 Cents.

THE POWER WAGON

ALCO

Motor Trucks

The Advance of the Alco

THIS business of the Alco is growing faster every day. The Alco not only leads in number of trucks now being built and sold, but it leads in increase of business.

From July 1, 1911, to May 1, 1912, the truck business increased 152 per cent.

Some months the increase was gigantic. Taking it day in and day out, the business has advanced consistently.

February, 1912, up to that time, was the best month the Alco truck ever had. March surpassed it.

April outdid March.

May, up to the time this went to press, had a big lead over April.

These figures, showing the increase month by month, since the beginning of the fiscal year, indicate the rapid advance forward of the Alco:

July 1911	over July 1910	surpassed	1700%
Aug. 1911	over Aug. 1910	surpassed	450%
Sept. 1911	over Sept. 1910	surpassed	1250%
Oct. 1911	over Oct. 1910	surpassed	110%
Nov. 1911	over Nov. 1910	surpassed	308%
Dec. 1911	over Dec. 1910	surpassed	64%
Jan. 1912	over Jan. 1911	surpassed	48%
Feb. 1912	over Feb. 1911	surpassed	176%
March 1912	over March 1911	surpassed	175%
April 1912	over April 1911	surpassed	40%

This is the evidence.

Merit always tells.

64-page catalog on request.

AMERICAN LOCOMOTIVE COMPANY, 1894 Broadway, NEW YORK

Builders of Alco 6-cylinder and 4-cylinder Motor Cars and Alco Taxicabs

Chicago Branch: 2501 Michigan Avenue
Boston Branch: 567 Boylston Street

Canadian Headquarters:
4280 St. Catherine Street, West, Montreal

Movers of the World's Goods since 1835

Capital, $50,000,000

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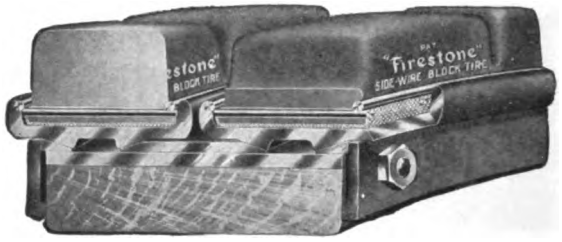
Two of the Six Fully-Proven "Firestone" Truck Tires

Hard Base—Channel Type
Furnished in Single or Dual Form



Side-Wire Block
Dual Form for Rear Wheels

Ten years' experience as leaders in motor truck tires is back of Firestone Truck Tires and Rims. Ten years of progress, step by step, has perfected them. Firestone, and not Firestone customers have paid for the experimental stage in all Firestone Tires and Rims.

We have a fully-proven tire for every Car, Load and Condition of Service. On regular rims or on Quick Removable rims for quick tire-changing *right on the spot.*

Hard Base—Channel Type

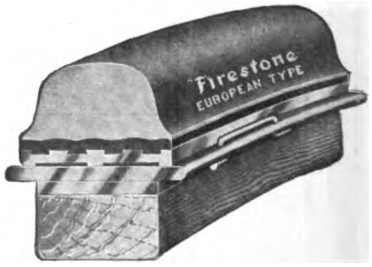
For resiliency in heavy service. This tire is vulcanized firmly into a channel with saw-tooth base. Consists of an extremely tough tread, cured to a hard rubber base.

The up-turned sides of the channel ensure the firmest possible base support against the tire working or tearing loose. Flat bands expand when in service, loosening the rim and tire; but the Firestone channel is too rigid to expand. At the same time it protects the rubber from side abrasion and allows it to wear down as long as there is enough left to give resiliency.

Side-Wire Block Tire

For traction, non-skidding and resiliency in heavy service. Has a continuous base, preventing abrasion from metal plates, as in other tires of this type. Worn or damaged blocks may be removed and new ones substituted without impairing the tire's strength.

Like the Hard Base—Channel type, it has all the advantages of Firestone quality of rubber.



Quick Removable Rim

Over two years in successful use. The original and *only perfected* one of its kind. Does away with vital weaknesses now in others. Accomplishes *in practice* just what we say *on paper:* "Enables the driver to make a quick tire-change right on the spot. Does away with lay-ups for tire-changes."

Write for full information and guarantees.

The Firestone Tire & Rubber Co., Akron, Ohio.

"America's largest exclusive tire and rim makers"

More Than 100 Service Stations for Truck Tires.

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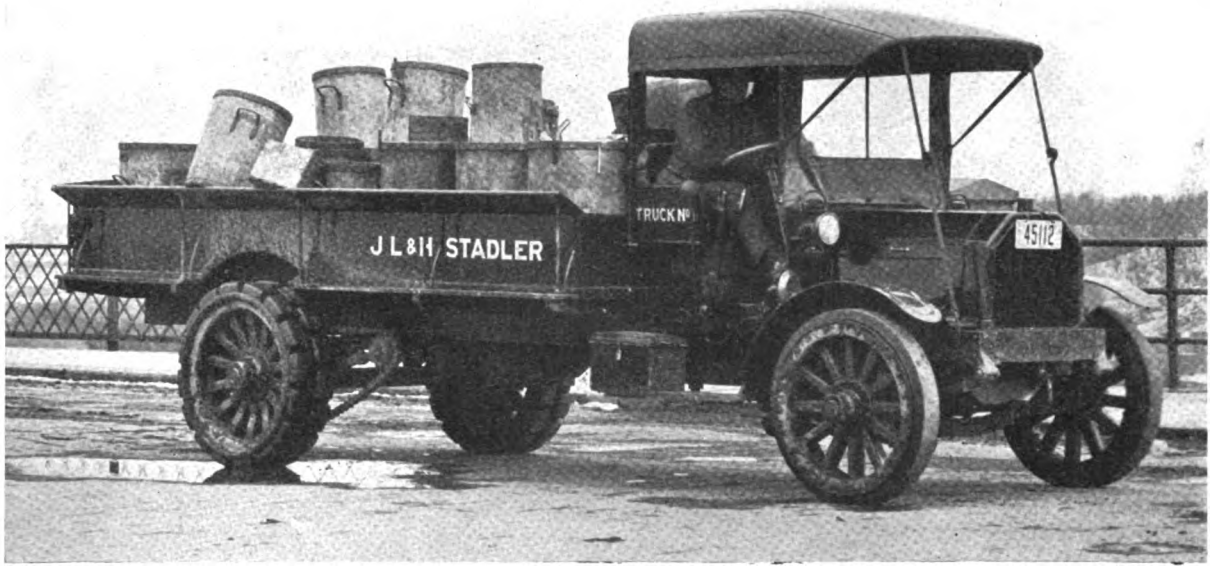

Peerless 5-Ton Motor Truck operated by J. L. & H. Stadler, of Cleveland. Its efficient performance has led to the purchase of two other Peerless Trucks.

PEERLESS MOTOR TRUCKS

3-Ton 4-Ton 5-Ton

THE 5-Ton Peerless Motor Truck illustrated above was placed in service last fall. During the winter it operated over roads at times nearly impassable for horses—often through snow-drifts that brushed the radiator.

Although each day's route called for some seventy stops, the driver found it possible to load and get away while a team would have been backing into place for loading; and the Peerless Truck averaged forty miles daily, without being laid up an hour for repairs.

This performance led to the purchase of the second Peerless Truck, which went into service March first. The two trucks replace seven two-horse teams. They have extended the radius of operation, and are doing the work better.

A third Peerless Truck has been ordered for the same service.

Peerless Trucks are giving good accounts of themselves This is in part due to our firm determination never to sell a Peerless Truck until we are reasonably assured that it will prove profitable to the user. Correspondence is invited.

Truck Department

THE PEERLESS MOTOR CAR CO.

Cleveland

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Three Things Make

Swinehart

Cellular Truck Tires

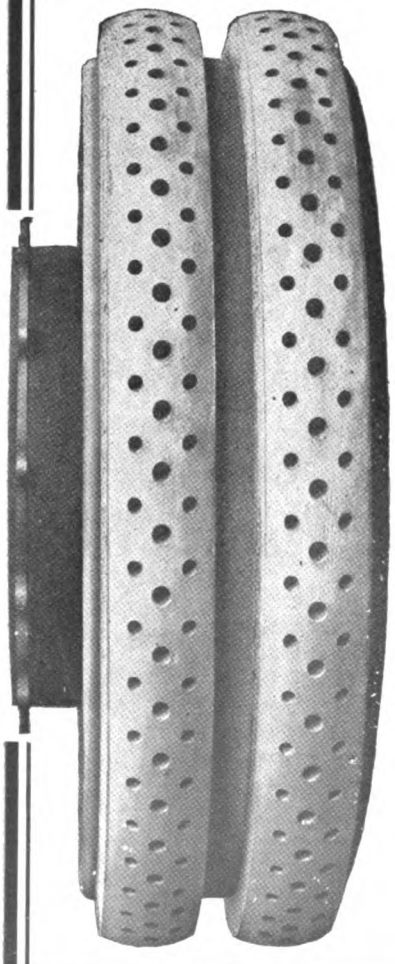
Demountable, Quick Attachable
Preferable for Truck Equipment

Non-Skid

The non-skid cellular tread increases the traction and eliminates undesirable slipping and friction, which always causes excessive wearing of the tire's surface. ¶ It eliminates the necessity for chains.

Non-Heating

The holes in the tire act as a radiator, preventing excessive heating and internal friction. ¶ The extra large surface of the Swinehart tread reduces the pressure per square inch to a point well within the safe and economical limit.



Resiliency

The wonderful elasticity, due to the combined use of our cellular design and the highest grade of rubber, allowing the tire to "give and take", to stand the road shocks without damage, is the true secret of Swinehart tire longevity.

In the hands of hundreds of owners Swinehart Cellular Truck Tires, due to their non-skid, non-heating, resilient features, show phenomenal results in mileage.

Let us show you actual records and explain in detail the construction of this cellular type.

We also make a full line of smooth tread single and dual solids—Demountable Quick Attachable Tires.

Branches and dealers in all principal cities.

The Swinehart Tire & Rubber Co.

1200 North Street :: AKRON, OHIO

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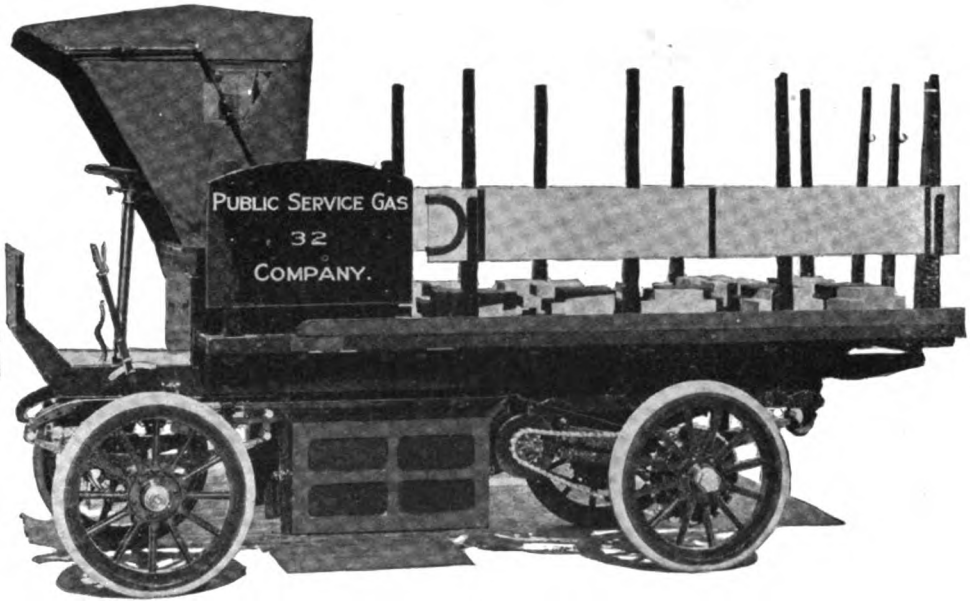
Baker Electrics

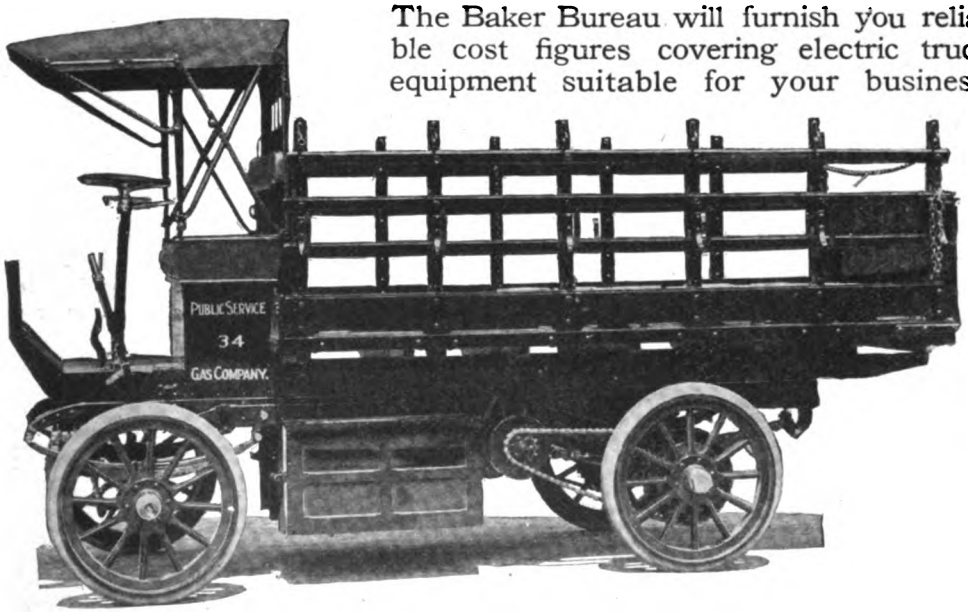
COMMERCIAL CARS



Where Efficiency Counts

It is significant of the superior efficiency of Baker Electric Trucks that so many of them are purchased in fleets by Express and Public Service Companies, whose transportation experience has taught them the economy of paying a little more for unusual construction and of saving a good deal more in cost of upkeep.

The Baker Bureau will furnish you reliable cost figures covering electric truck equipment suitable for your business.



Baker Electrics

COMMERCIAL CARS

The Baker Motor-Vehicle Co. Commercial Car Department

69 West 80th Street, Cleveland, Ohio — Dealers in Leading Cities

Oldest and Largest Manufacturers of Electric Vehicles in the World

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The Real Test of Truck Tires
The Real Test of Truck Tires
is not service on smooth, well kept main thoroughfares—the real test is service around warehouses, depots, terminals and wharves where pavements are always at their worst.
Diamond Wire Mesh Base (Spliceless) Truck Tires are built to give Mileage and Service under all conditions.
A rugged tire that absorbs and distributes the terrific shocks of the impact of a heavily loaded truck on the roughest pavements and the only solid tire that does so.
A one piece (spliceless) tire, correct in design, and the largest selling solid rubber motor truck tire in America—that's the Diamond Wire Mesh Base Truck Tire.
Write for our book "The Profit Side of a Motor Truck"
The Diamond Rubber Company
AKRON, OHIO
Diamond
WIRE MESH BASE
TRUCK TIRES
SINGLE TYPE

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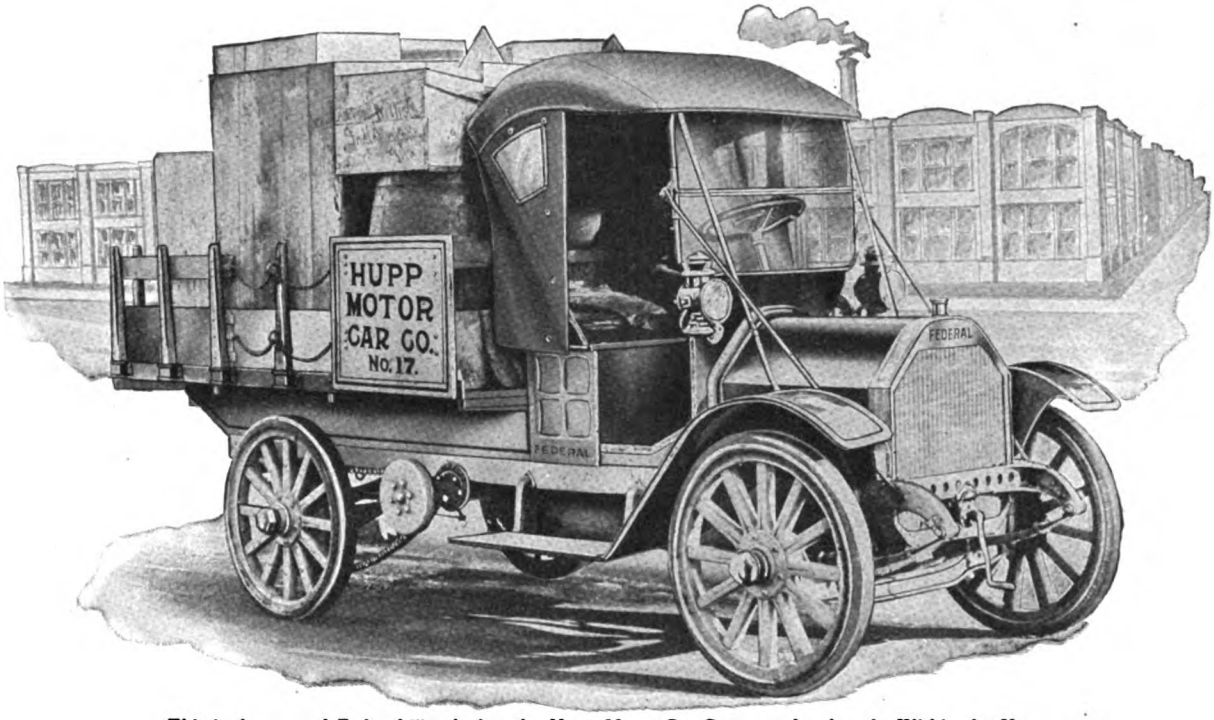
The Man Who Buys the Federal Always Buys the Federal Again



This is the second Federal Truck that the Hupp Motor Car Company has bought Within the Year.

Federal one-ton chassis, including seat, $1,800. Body type at purchaser's option. Wheel-base, optional, 110-inch or 144-inch. Motor, 4 cylinder, 30 H. P.; Magneto, high-tension; Clutch, 16-inch cone; Transmission, three speeds forward and reverse; Hyatt high-duty bearings; Tires, solid, 36x3½-inch front and 36x4-inch rear.

The best customers of the Federal are motor car manufacturers, designers and engineers. Do you grasp the significance of that?

THE FEDERAL

The Best Advertisement in the World is the Act of the Man who Repeats His Order.

ONE-TON TRUCK $1800

The Abbot Motor Car Co. got their first Federal truck Sept. 20, 1911, and their **second** Federal Truck March 30, 1912.

The Detroit City Gas Company bought their first Federal truck June 23, 1911; their second July 6 and their **third** August 29.

The Gemmer Mfg. Co. bought their first Federal truck August 22 and their **second** March 12, 1912.

Beecher, Peck & Lewis got their first Federal truck Jan. 12, 1912, and the **second** March 14, 1912.

These are all firms operating in Detroit, Mich. They have figures recording in dollars and cents the durability, the reliability, the efficiency and the economy of the Federal. That is the reason they bought a second and a **third** Federal truck to **reduce the cost** of their **deliveries.** Write for those figures.

Those cold, convincing figures brought these manufacturers, merchants and engineers to the logical conclusion that the Federal at $1800 is preeminently the cheapest as well as preeminently the best Standard One-Ton-Truck on the market.

And here is a **partial list** of the Manufacturers, jobbers and distributers in various parts of the country that have repeated their initial orders for the Federal truck.

The Portland Railway, Light & Power Co. of Portland, Ore., has **Eight Federals.**

The Star Carriage Co., of Seattle, Wash., has **Four Federals.**

The Witherbee, Sherman Co., of Mineville, N. Y., has **two Federals;** Haggard & Marcusson, Chicago, three Federals; Walther-Williams Hardware, the Dalles, Ore., **two Federals;** J. Cunningham, Rochester, N. Y., **two Federals;** Emmons Draying Co., San Francisco, **two Federals;** Motor Bus Transit Co., Gary, Ind., **four Federals;** Marshall Field Co., Chicago, **two Federals;** American Bank Note Co., New York City. **two Federals;** J. F. Grantham & F. M. Stultz, Gary, Ind., **two Federals;** Lemp Brewing Co., St. Louis, **two Federals.**

We can offer no better selling argument than the names of these scientific men, these close-buying men, these hard-headed business men who have tested, accepted and endorsed the Federal and ***come back*** *for more.*

FEDERAL MOTOR TRUCK COMPANY

New Factory, Dept. C, Leavitt and Campbell Avenues, Detroit, Mich.

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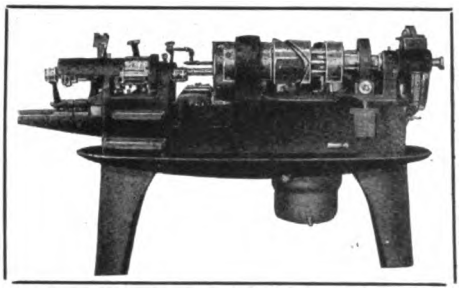
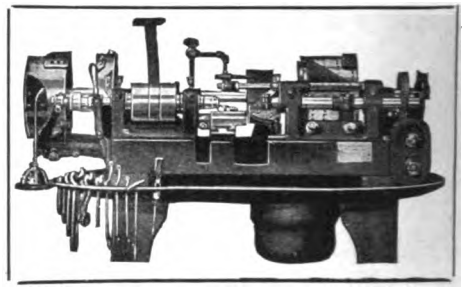
The

Pre-eminence of the Cleveland is Indisputable



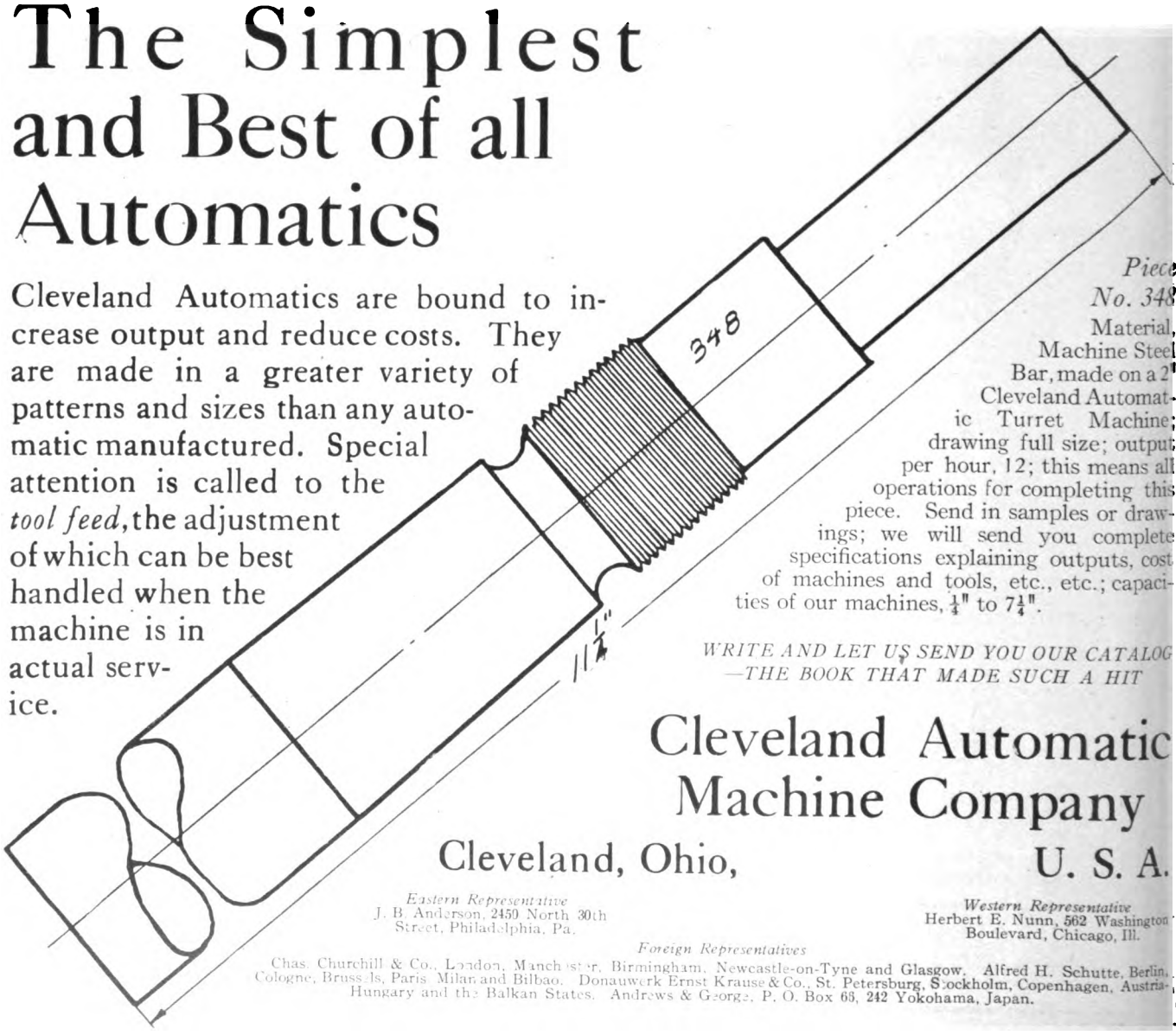
Operating Expense One Mill A Minute



Your Overhead Charges Added To The Above Will Give You The Exact Cost Per Piece

The Simplest and Best of all Automatics

Cleveland Automatics are bound to increase output and reduce costs. They are made in a greater variety of patterns and sizes than any automatic manufactured. Special attention is called to the *tool feed*, the adjustment of which can be best handled when the machine is in actual service.



Piece No. 348 Material, Machine Steel Bar, made on a 2" Cleveland Automatic Turret Machine; drawing full size; output per hour, 12; this means all operations for completing this piece. Send in samples or drawings; we will send you complete specifications explaining outputs, cost of machines and tools, etc., etc.; capacities of our machines, $\frac{1}{4}$" to $7\frac{1}{4}$".

WRITE AND LET US SEND YOU OUR CATALOG —THE BOOK THAT MADE SUCH A HIT

Cleveland Automatic Machine Company

Cleveland, Ohio, U. S. A.

Eastern Representative
J. B. Anderson, 2450 North 30th Street, Philadelphia, Pa.

Western Representative
Herbert E. Nunn, 562 Washington Boulevard, Chicago, Ill.

Foreign Representatives
Chas. Churchill & Co., London, Manchester, Birmingham, Newcastle-on-Tyne and Glasgow. Alfred H. Schutte, Berlin, Cologne, Brussels, Paris, Milan and Bilbao. Donauwerk Ernst Krause & Co., St. Petersburg, Stockholm, Copenhagen, Austria-Hungary and the Balkan States. Andrews & George, P. O. Box 65, 242 Yokohama, Japan.

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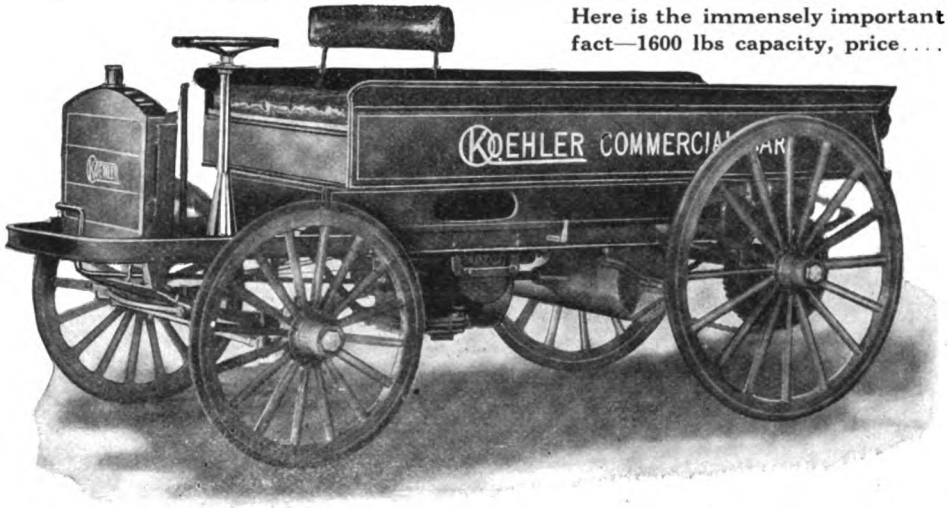
KOEHLER COMMERCIAL CAR

CARRYING CAPACITY 1600 LBS. $ PRICE 750.

The Maximum and Minimum Car

No other delivery wagon can compare with the value, capacity and service which this car offers.

Here is the immensely important fact—1600 lbs capacity, price.... **$750.**



Various types of bodies are obtainable. The Panel Type B is an unusually handsome job. Price $150 extra. Inside measurements 42 inches wide, 53 inches from floor to top, 84 inches back of driver's seat to rear. Canvas side body similar in appearance to Panel type B $50 extra.

OPEN FLARE-BOARD TYPE

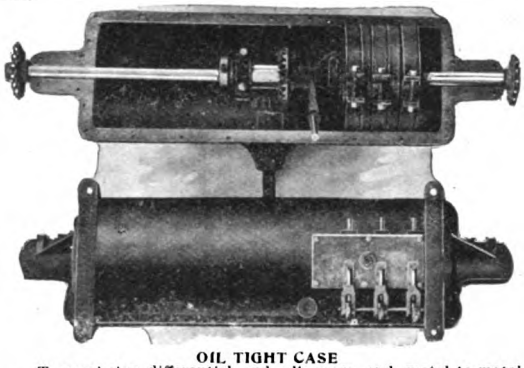
Large and Roomy—Inside measurements 44 inches wide, 84 inches back of driver's seat to rear, Flare-boards, 17 inches above floor. Strongly ironed throughout, also ironed to receive four-post canvas top, which can be had from stock at $40 additional. Suitable for general express work. CARRYING CAPACITY, 1600 LBS. PRICE, $750. Prices of Various Types of Bodies Range From $40 to $150 Extra.

The KOEHLER COMMERCIAL CAR was designed by and is built under the supervision of L. E. Schlotterback—the foremost commercial car designer. A man who has spent his business life solving transportation problems.

The KOEHLER is a glutton for work. Built to withstand the most severe usage. Will take the punishment of 365 days' work a year without any trouble—a delivery car from the ground up—**not a converted pleasure car.**

SPECIFICATIONS

MOTOR:—Two-cylinder, horizontal opposed, 4 cycle, 22-24 H. P. Bore 5¼ inches. Stroke 4 inches. 300 miles one change of oil.
COOLING SYSTEM:—Thermo-syphon through large pipes and large radiator at front of car. Piping and connection exceptionally heavy.
IGNITION:—Jump spark with strictly high tension Bosch magneto.
STEERING GEAR:—Bevel pinion and sector type, 16-inch hand wheel.
DRIVE:—Motor in direct line with jack-shaft and immediately connected thereto by a universal joint.
TRANSMISSION:—Planetary type. All gears of genuine chrome nickel steel, hardened throughout, running with phosphorous bronze bearings on hardened and ground shafts in semi-steel casings. Transmission bands also of semi-steel which cannot slip or burn. High speed clutch, cone type, metal to metal running in oil.
FRAME:—A channel section steel frame "U" shaped, 3x1½ inches, is continuous and extends at front of car, acting as bumper, protecting radiator and forward part of car.
AXLES:—Front axle, 1¼ square, positively a one-piece drop forging with knuckle yokes integral. Rear axle, 2 inches square. Those experienced will appreciate these axle dimensions and the fact that neither axle is welded. Both axles are 40 pt. carbon steel.
TIRES:—Two inch solid rubber motor side wire. **WHEELBASE:**—85 inches. **TREAD:**—58 inches. **SPEED:**—Four to 16 miles per hour on direct drive. **WEIGHT:**—Approximately 2000 lbs. Weight varies according to body equipment **FUEL CAPACITY:**—Gasolene 16 gallons; Oil 1 gallon. Both gasolene and oil tank accessible under seat.
SIMPLICITY:—The KOEHLER COMMERCIAL CAR cannot be compared with the ordinary light delivery car. This car is designed to take the place of the one and two-horse vehicles and is so simple in operation that the drivers of the horse-drawn vehicle can successfully operate it.



OIL TIGHT CASE

Transmission, differential and all gears and metal-to-metal clutch run in a constant oil bath—one of the greatest features ever put into any car at any price. One supply of oil to this case is good for 1000 miles.

Particularly adapted to all merchants—large and small. Dry goods, hardware, laundries, groceries, butchers, etc., etc.

DEALERS

Territory is now being closed. Write for catalog and agency terms.

Address all Correspondence to **1709 Broadway, New York**

H. J. KOEHLER S. G. Co. **"BUILT IN NEWARK, New Jersey"**

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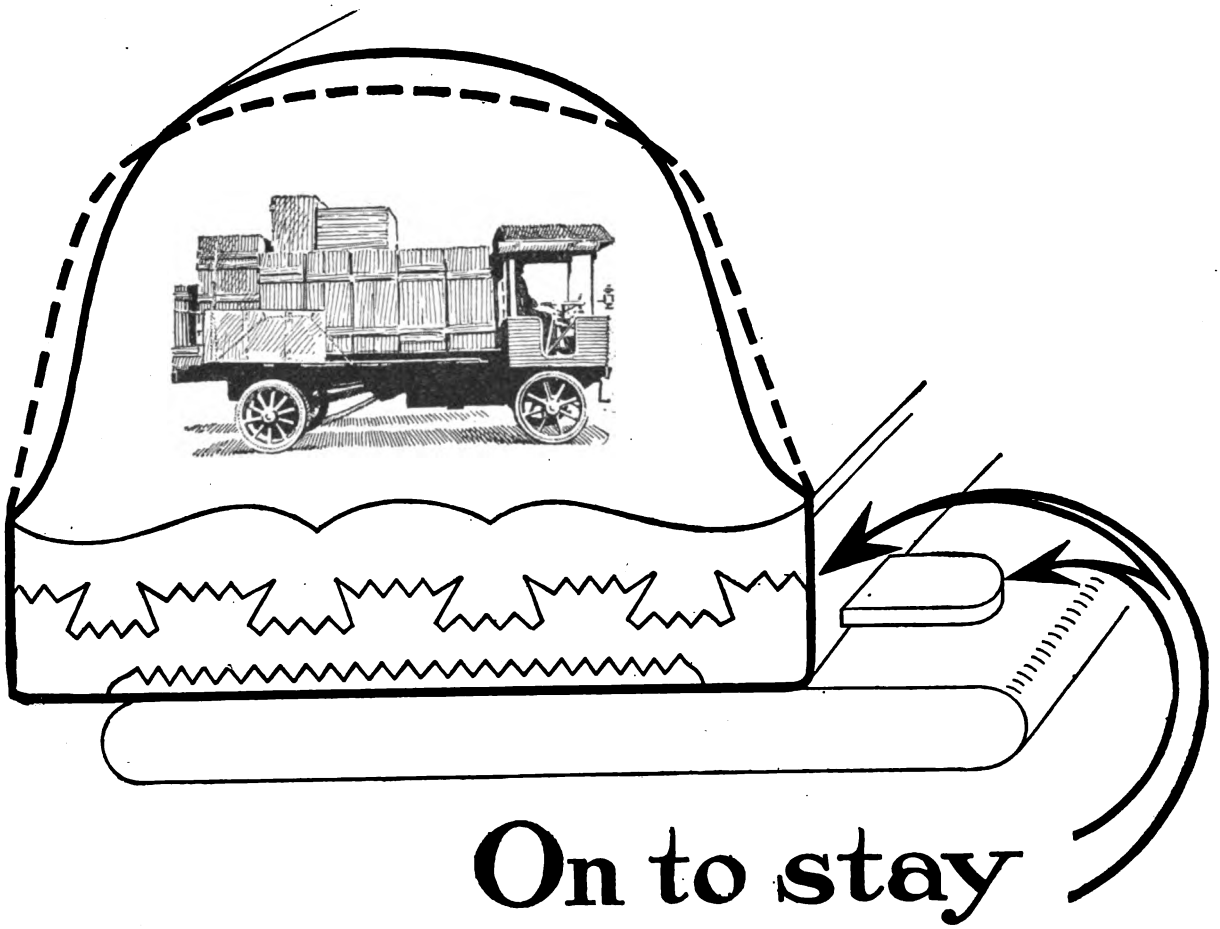

On to stay

A big item of truck tire cost—(often not realized when buying tires)—is the delay and "dead time" due to tire slipping off rim, or other misplacement, while in service.

In the Goodrich Wireless Truck Tire, the tire and rim are a perfect unit. The tire proper is built on a dovetailed steel base into which the hard rubber sub-base is keyed—making sidewise movement impossible. A transverse key on the outer side prevents circumferential movement or "creeping." (See cut above.)

This is one of the logical reasons why the Goodrich Wireless stays on and gives 10,000 miles and upward of uninterrupted service. There are other reasons:

1: The Goodrich Wireless method of fastening tire to rim. This absolutely prevents the tire from giving 'way at the base before full wear on the tread has been obtained.

2: The tire was scientifically patterned so that it would assume, under load, the shape that gives it the greatest traction and resiliency, without damaging distortion. (*Normal and load contours shown in outline illustration above.*)

3: The rubber compound of the tread is so tough that you can hardly stick a pin into it. Full wear on this tread means far more than "full wear" on the ordinary tire tread. It is a perfect combination of extreme toughness with resiliency.

Many imitations of the Goodrich Wireless are now springing up. But remember we were the *first* to bring out the steel base tire in America. The Goodrich is the *only* wireless tire that has been *perfected* to meet American conditions. The shape, quality of rubber, and the distinctive wave-line of contact between soft and hard rubber are *Goodrich* features. Buy the *original.*

TRADE MARK

The B. F. GOODRICH CO.,
AKRON, O.
Largest in the World
Branches in the Principal Cities — Wholesale Tire Depots Everywhere

GOODRICH WIRELESS

Built on Steel **TRUCK TIRES** Wear like Steel

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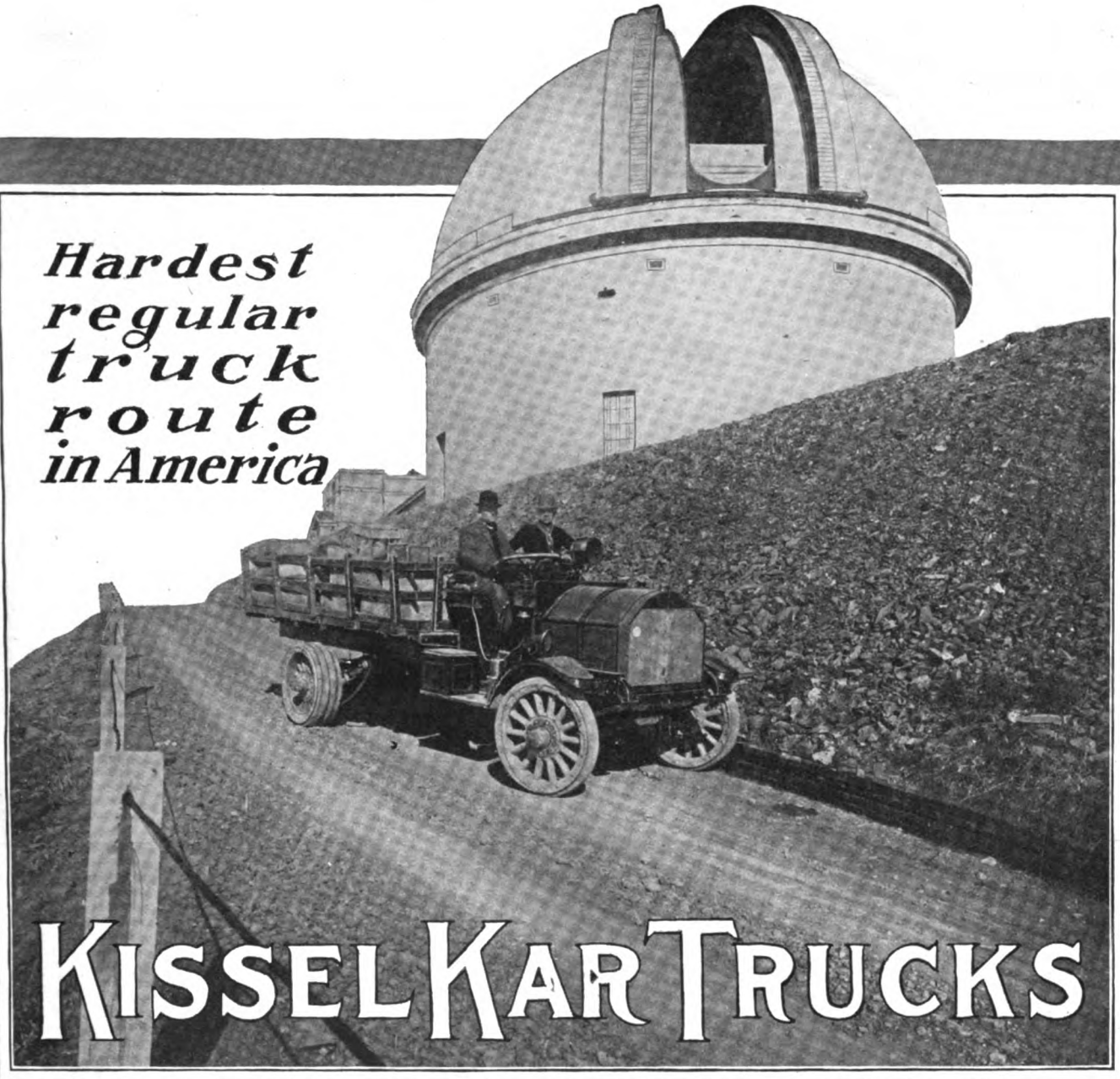

Hardest regular truck route in America

KISSELKAR TRUCKS

FROM San Jose, Cal., to the top of Mount Hamilton, site of the famous Lick Observatory, is twenty-seven miles. This is a regular truck run of a 3-ton KisselKar Truck. The record run, carrying a four and a half ton load, which is a ton and a half above the three ton rating, is six hours, twenty-five minutes.

The first twenty miles was made in three hours. The last seven miles with a rise of twenty-two hundred feet, and three hundred and sixty-five turns, many dangerous, were covered in three hours, twenty-five minutes. The altitude of Mt. Hamilton is 4209 ft. This 3-ton KisselKar Truck makes six trips a month, always loaded in excess to rated 3-ton capacity.

1 1-2 to 2 ton, 3, 4, 5 ton Trucks, Delivery Wagons, Ambulances, Fire Department Apparatus, etc.

WRITE FOR CATALOG describing complete KisselKar line of trucks also pleasure models — "Thirty," "Forty," "Fifty," "Sixty," $1500 to $3000.

Kissel Motor Car Co., 158 Kissel Avenue, Hartford, Wisconsin

Boston New York Chicago Milwaukee Kansas City Los Angeles Minneapolis

Philadelphia, Cleveland, Detroit, St. Louis, Dallas, El Paso, San Antonio, New Orleans, Baltimore, Omaha, Butte, Denver, San Francisco, Seattle, Portland, Duluth, Buffalo, Pittsburgh, Hartford, Conn., New Haven, Albany, Troy, Montreal, Quebec, Toronto, Winnipeg, and 200 other principal points throughout the United States.

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TIRE TIPS

Summer is on its way and in purchasing tire equipment HEAT is the Factor to be considered.

The heat generated by a tire is the greatest Factor in its destruction. Continued Heat is Death to rubber.

Get rid of the heat by using a sectional tire.

Kelly-Springfield Sectionals

are "Air-Cooled" between sections.

They are ideal on hot asphalt roads; each section works for an instant—rests until its turn comes again.

They have plenty of room to expand lengthwise as well as laterally, thus giving double the resiliency.

KELLY-SPRINGFIELD Sectionals mean Economy in Tire Costs.

KELLY-SPRINGFIELD TIRE CO.

NEW YORK, N. Y., and AKRON, O.

BRANCHES— Boston, Mass. Atlanta, Ga. Chicago, Ill. Cincinnati, O. Cleveland, O. Philadelphia, Pa. San Francisco, Cal. Baltimore, Md. St. Louis, Mo. Los Angeles, Cal. Seattle, Wash. Detroit, Mich. Buffalo, N. Y.

Please mention the "Power Wagon" when writing to advertisers.

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MODERN

THE BOWLING GREEN MOTOR CAR COMPANY

The True Value of a Motor Wagon Depends on its Freedom from Interruption of Service

The Modern is built on that idea

Tested in many lines of business----Strongly endorsed by users in every section

EXCEPTIONAL QUALITY OF DESIGN AND APPEARANCE

Capacity 1000-1300 Lbs. - - - Chassis, $1200
1500-2000 Lbs. - - - Chassis, $1600

PROMPT DELIVERIES

Dealers of highest standing are invited to inquire for territory, giving sales and service facilities.

Write for catalog

The Bowling Green Motor Car Company

Bowling Green, Ohio

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First in the field — first in quality — first in the favor of users.

J. L. G. & Bro. 6/1/12

GIBNEY Wireless

The Three-Years-Ahead Tire

WE are not surprised that practically all the manufacturers are now advocating the **GIBNEY** type of tire. It is proof that although we were the pioneers, we were right in the beginning, and it is a guarantee to the buyer of solid tires that he will get the maximum of advanced ideas, the best quality and most experience, if he buys

GIBNEY TIRES

Are you interested in knowing what users of GIBNEY TIRES have to say about GIBNEY TIRES? The following letter is unsolicited:

Extract from letter dated Nov. 23, 1911.

"..... We are pleased to state that the Gibney Tires which have been furnished to us by you have given entire satisfaction and are running from 14 to 18 months.

We have had as high as two years service out of the Gibney Tires."

(*Signed*)

F. A. POTH & SONS,
Philadelphia.

THOSE buyers who have been using **Gibney Tires** during the past three years are pleased to know that their foresight was based on recognition of merit. Although the **Gibney** type of tire is three years ahead of the times, it is right in construction and material, which therefore is a vindication of the good judgment of those buyers who recognized its superiority before this type became adopted almost universally by other tire makers. It pays to deal with leaders, and for that reason it will pay you to buy **Gibney Tires.** You will get the maximum of service, because you get the benefit of the best there is in the tire world.

James L. Gibney & Bro.

217 N. Broad Street, Philadelphia **248-52 W. 54th Street, New York**

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Speedwell MOTOR TRUCKS

2, 4 and 6 TON CAPACITIES

Why a Speedwell Motor Truck, at full price, is the best possible truck investment

In the first place, Speedwell Trucks of 2, 4 and 6 ton capacities are built in the best possible way, of the best possible materials and designed in the best possible manner for efficient continuous service—the truck itself is verification of this.

To the cost of such a truck is added a sufficient margin to cover a fair and equitable profit and to provide for future exigencies to co-operate with truck owners in giving continuous service.

It is a fixed and inviolable Speedwell policy never to discount prices and it is to the interest of the truck owner that this policy is absolutely maintained.

When a truck manufacturer or dealer discounts prices, the truck buyer suffers in one of two ways and probably in both. Either the original price discounted is based on a false standard of value, or there is no margin left to provide future service to the user which is of greatest possible importance if his investment is to be a profitable one.

In the first case, either the original price is inflated above real value or the quality standard of the trucks has been lowered to make the lowered price possible—an undesirable condition to the buyer in either event.

In the second case, by discounting the price there is no margin left to render future service and keep the truck running—a disadvantage to the buyer that concerns the most vital factor of the entire field of motor trucking.

The whole matter resolves itself to this:—It costs money to build a good machine product like a truck and it costs money to keep it running, to give attention and service to the buyer. If you pay the price you'll get all this, but if you do not pay the price obviously you won't.

In the Speedwell, you get a good product and you get service which cannot be obtained at anything less than Speedwell fixed prices.

Consider this carefully before you buy any truck.

Literature Upon Request

THE SPEEDWELL MOTOR CAR COMPANY

655 ESSEX AVENUE, DAYTON, OHIO

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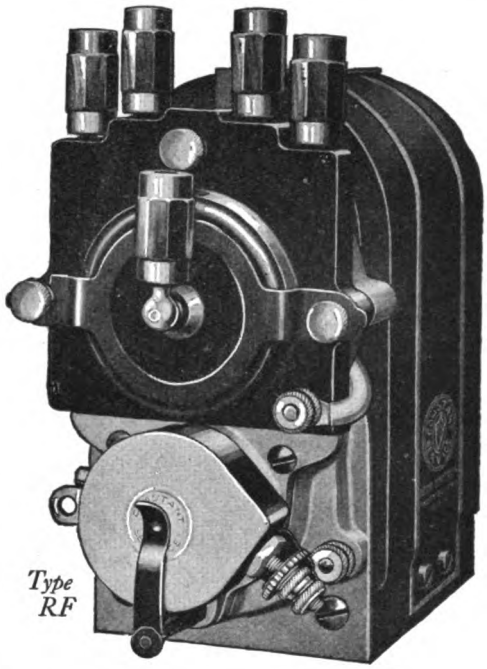
Trucks and Tractors Demand


Type RF

a very intense spark that will fire, under all conditions, large slow speed motors. Actual service proves the only ignition that will produce that never-failing, white-hot spark is the

Remy Heavy Duty Magneto

(Type RF)

This type is built especially for use with heavy duty motors, and possesses the sturdy strength and simplicity that characterizes all Remy Equipment.

So extraordinary is the efficiency of the Type RF Magneto that many of the largest truck and tractor manufacturers in the country use this Remy Magneto as their standard equipment. Their product calls for only the highest quality ignition, and experience has shown that the Remy is unequaled.

Remy Service
places at your disposal a network of Service Stations with experts always ready to keep your trucks free from ignition troubles.

Remy Electric Company

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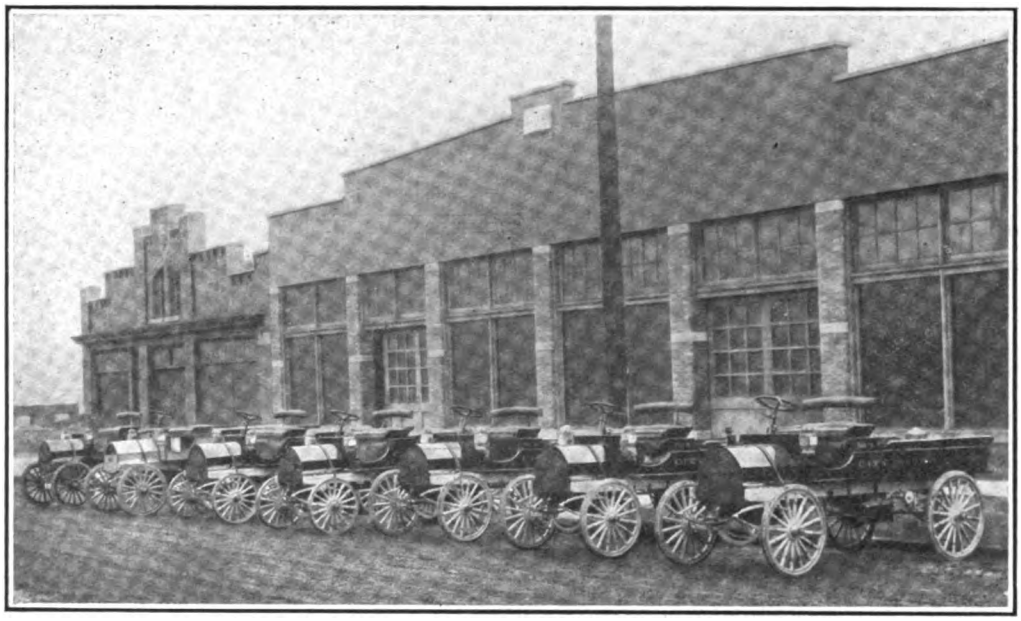
Determining Factors

Chase Trucks



Group of Chase trucks recently delivered to City Water Department, Seattle, Wash.
Models D (1000 lbs.) and K (2000 lbs.) Capacity

Cost and Efficiency

should always be the determining factors in your purchase of a motor truck. They need to go together.

You will not hesitate in your preference for a motor truck when it seems to satisfy your standard of efficiency.

You will, however, go slowly in buying such a truck when its price is way beyond your expectations.

Now the reason that CHASE trucks meet such a ready sale everywhere is simply because their absolute efficiency has been recognized for years by representative merchants and manufacturers and also because the prices of the various CHASE models are much lower than prospective purchasers expected to pay.

That the CHASE is popular among the great New York department stores is evidenced by the fact that R. H. Macy & Co. and Stern Brothers have each given repeat orders, also James A. Hearn & Sons whose repeat order has just been received. Among the latest big stores to install the CHASE is Abraham & Straus.

Chase service satisfies all classes

5 Models, 1000 to 4000 lbs. Capacity

CHASE MOTOR TRUCK COMPANY

200 W. Jefferson St. SYRACUSE, N. Y.

Please mention the "Power Wagon" when writing to advertisers.

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124 G. V. ELECTRICS FOR THE ADAMS EXPRESS COMPANY

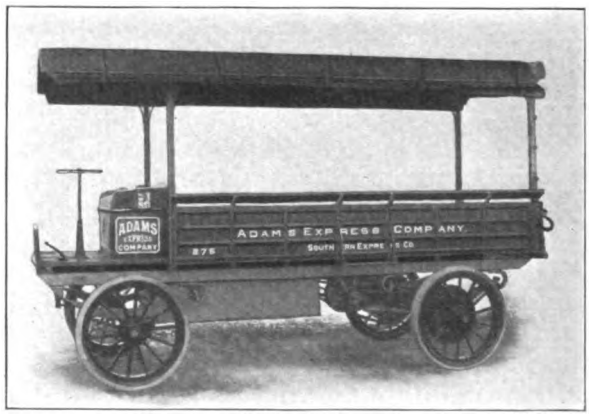
The General Vehicle Company announces the sale of 37 more 2-ton G. V. trucks to the Adams Express Company. These 37 with 87 already operated by them makes the total 124.

Many of the 87 referred to are over ten years old. They are in service in Rochester, Brooklyn and Indianapolis. The new ones go to Philadelphia.

The American Express Company has purchased 58 G. V. trucks since November, 1911. They are of 2-tons and 3½-tons capacity.

Whites Express Company of Brooklyn operate 9 G. V. trucks and Wells Fargo Company and Chase Express Company (Brookline Mass.,) several. The National Express Company has just bought some also.

Who sells the fleets?



Catalog 72 on Request

GENERAL VEHICLE COMPANY

Principal Office and Factory - - - - - Long Island City, N. Y.

NEW YORK	CHICAGO	BOSTON	PHILADELPHIA	ST. LOUIS
505-5th Ave.	Otis Building.	84 State St.	Witherspoon Bldg.	Wainwright Bldg.

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THE POWER WAGON

No. 91. CHICAGO, ILL., JUNE, 1912. No. 91.

Issued first of each month by THE POWER WAGON PUBLISHING COMPANY, 332 South Michigan Avenue, Chicago.

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ADVERTISING RATES UPON APPLICATION

Advertisers' copy must be received not later than the 10th of the month preceding date of issue when proof is to be submitted.

Entered as second-class matter December 2, 1907, at the Postoffice at Chicago, Ill., under the Act of Congress on March 3, 1879.

A Fleet of 10-Tonners.

Big Coal Company Has Probably the Most Remarkable Motor Service in the World.

"THE MOTOR TRUCK has practically solved our most perplexing problems—it is the mainstay of our delivery system," replied one of the greatest coal merchants of New York, when asked to place his valuation upon the power vehicle as a factor in the transfer of the black diamonds from the enormous storing pockets to the coal cellar of the consumer.

The delivery of coal presents a combination of difficulties not to be found in any other business. The demand is necessarily seasonable. During the winter months it reaches its highest point, and then, under the most severe and exacting conditions, maximum efficiency is required of a delivery service, which must be capable of working from 12 to 18 hours a day, and at times both day and night for seven days in the week; while during the summer there is not enough business to keep one-half of the equipment in service. The disparity between these two situations has made the delivery service the most expensive and inefficient factor connected with the trade.

Before the advent of the motor wagon, it was necessary for the large coal companies to go into the market every fall and purchase hundreds of heavy truck horses, use them with more or less success in the sleet and snows of the winter, and in the spring either sell them off at a loss, or turn them out to "eat their heads off" in idleness, which, in either case, was prohibitive of economy. To them power wagons have come as a blessing—but not in disguise—as the machines are able to work day and night during the heavy rush of the fall and winter with far greater efficiency than any horse equipment, and, when the summer dullness in coal delivery arrives, they may be withdrawn from service, laid up in the garage, overhauled and painted, while the business is carried on with the light motor vehicles, or with the horse equipment, which is thus kept in service the entire year. Thus instead of the heavy loss of feeding a great number of idle horses, the machines are causing virtually no expense whatever—a little interest, storage, insurance and depreciation, which is necessarily low, due to the fact that a motor truck is no older than its term of actual service.

The Burns Coal Company purchased its first power wagon, which was a 10-ton Hewitt, in June, 1909. This great machine was run day and night during the summer and the following winter with such remarkable success that an order was placed for the delivery of ten 10-ton Hewitt trucks in October, 1910.

But wishing to test the efficiency of a truck with smaller capacity, the company purchased two 5-ton Mack machines in December, 1909. Experience proved, however, that the 10-ton trucks were more economical for the company's business than those of the smaller capacity.

One of the 10-ton motor coal trucks which are showing remarkable economy in the service of Burns Brothers.

The two 5-ton Mack and the eleven 10-

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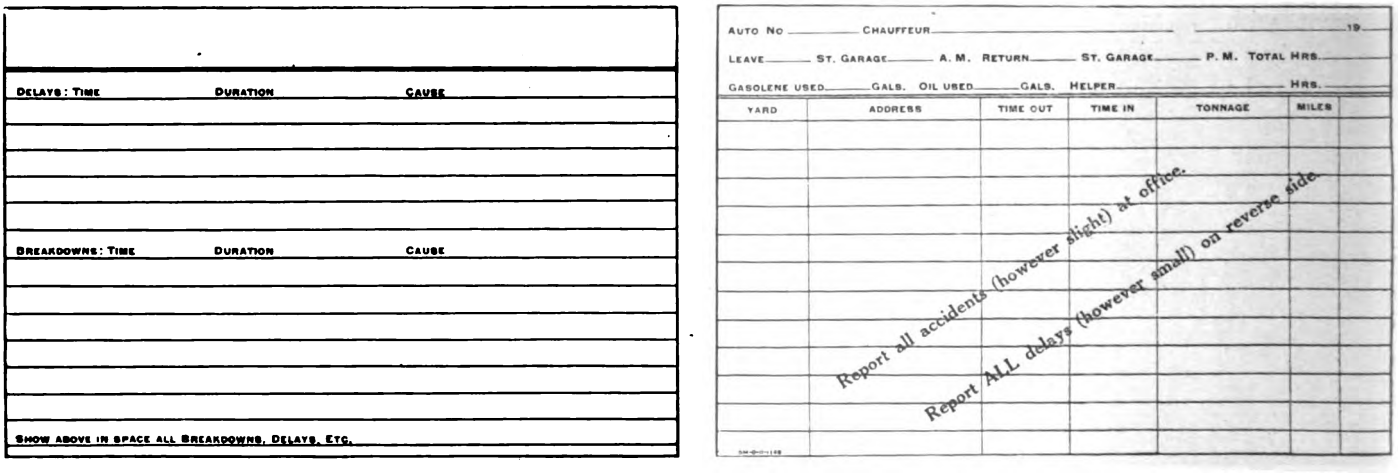
Discharging 10 tons of coal without disturbing street traffic to any appreciable extent.

ton Hewitt trucks were equipped with regulation bodies, having side coal chutes, but this was inconvenient because of having to make deliveries over wide sidewalks, and the elevating body suggested itself. Owing to the apparent danger, there was some hesitation in making such a body for a 10-ton load, so, as an experiment, the two 5-ton trucks were equipped with elevating bodies, and the results obtained were so satisfactory that the order for five 10-ton Hewitts, which was placed for delivery in April, 1911, specified elevating bodies of six tons capacity.

In order to make its motor equipment more elastic, the Burns Company purchased in the fall of last year four 3-ton Hewitt trucks, equipped with elevating bodies, and these have been used with marked success for deliveries at three to four miles from the nearest coal yard.

The Burns Coal Company considers its motor trucks the most vital and valuable part of the delivery equipment, and does not hesitate to say that the future will see a continual displacement of the horse-drawn wagons by motor vehicles of varied capacities. Since no motor wagon is fully efficient unless working continuously at its rated capacity, and as there is only a limited number of consumers who place orders for ten tons or more at a time, it is quite evident that the greatest increase in the company's motor equipment will be with the lighter trucks. The 3-ton machines have proven beyond doubt that they are more eco-


DELAYS: TIME DURATION CAUSE

BREAKDOWNS: TIME DURATION CAUSE

SHOW ABOVE IN SPACE ALL BREAKDOWNS, DELAYS, ETC.

AUTO NO. CHAUFFEUR 19

LEAVE ST. GARAGE A. M. RETURN ST. GARAGE P. M. TOTAL HRS.

GASOLENE USED GALS. OIL USED GALS. HELPER HRS.

YARD	ADDRESS	TIME OUT	TIME IN	TONNAGE	MILES

Report all accidents (however slight) at office.

Report ALL delays (however small) on reverse side.

Front and reverse sides of the drivers' report card. (The diagonal instructions are in red.)

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nomical than the horse-drawn wagon when operating within a radius of three to four miles, but it remains for a far cheaper truck than is now constructed to displace the horse delivery of small quantities of coal within a very limited distance.

* * *

How the Machines Are Garaged.

The garage facilities of the Burns Company consist of a four-story building on West 40th street, the first floor of which is used for storing eleven of the 10-ton machines, the second and third, as stables for a part of the horse equipment, and the fourth floor as a storeroom and repair shop. The other garage is situated at 107th street and East River, where storage, with gasoline, oil and grease supply is provided for three 3-ton, five 6-ton, and two 5-ton trucks, the other 3-ton machine being garaged in Jersey City, and repaired by the chauffeur mechanic. All the more important repairs are conducted at the central garage on West 40th street, where the mechanical force consists of the foreman in charge, and five men during the winter, and three during the greater part of the summer. One mechanic is on duty at night to make incidental repairs and adjustments, and to supply oil and gasoline to the machines. The mechanical force at the 107th street garage consists of one man on duty in the day and one at night, and since all the heavy repair work is done at the West 40th street repair shop, their duty consists in making minor repairs, and supplying oil, grease and gasoline.

The machines go into service about the first of Octo-

Loading one of the big machines by up-to-date methods.

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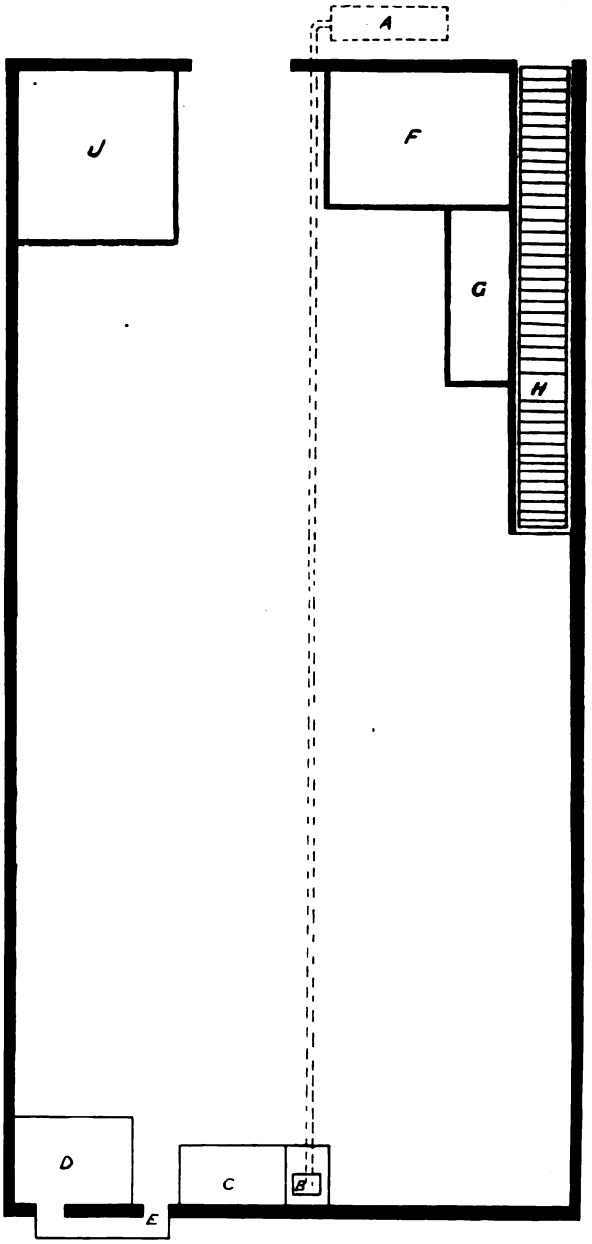
Mack dump truck with body elevated.

ber, and run full time until the first or the middle of April, when they are withdrawn from service, laid up for overhauling and painting, and put in first-class condition for work the next fall. From the first of April to the first of October deliveries are made almost entirely with the horse wagons. The Burns horse equipment varies from 650 to 800 horses, and a complement of approximately 250 wagons, consisting of one, two, three, five and seven-ton vehicles.

One of the illustrations shows a plan of the first floor of the West 40th street garage. At *A* is shown a 265-gallon capacity gasoline tank. An underground pipe conducts the gasoline to a hand pump *B* in the rear of the building, from which it is distributed to the machines in five-gallon cans. *C* is the manure chute from the stables on the second and third floors. *D* is the steam heating plant, the entrance to which is from the outside through an alley way from the door at *E*. In the rear of the office, which is situated at *F*, is the oil and grease storage room *G*. *H* is the runway for the horses, leading to the second floor. *J* is the elevator, which serves all four floors. On the fourth floor will be found the repair shop and store room.

Oil, grease and gasoline are ordered by contract, and although a sufficient supply is always kept on hand, no attempt is made at storing a large quantity, since a telephone call brings any amount desired on two or three hours' notice.



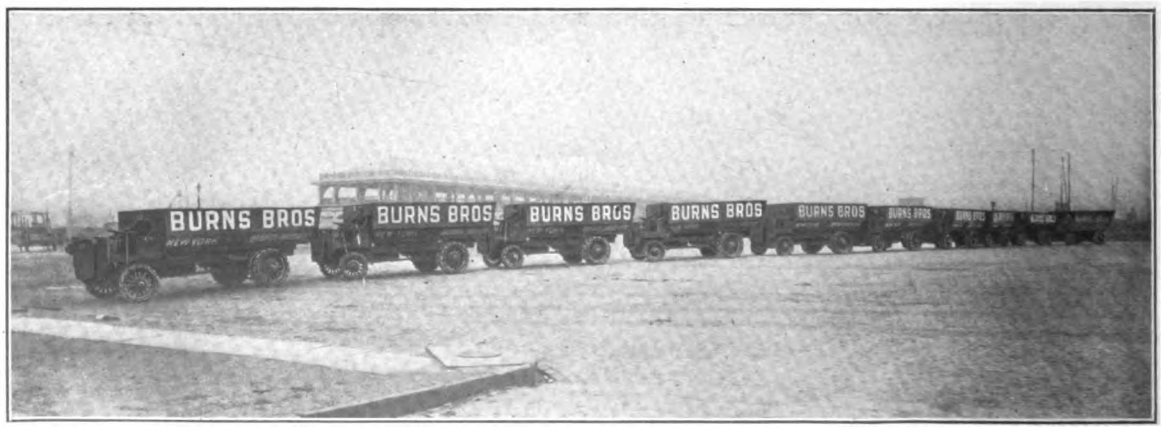
Plan of first floor, W. 40th street garage.

The mechanics receive from $18.00 to $25.00 per week, the average being about $21.00.

* * *

Drivers, Helpers, and Wages.

The Burns Company employs about 25 regular drivers, who receive $22.00 per week for a ten-hour day. To each



Some of the 10-ton Hewitt motor wagons used by Burns Brothers.

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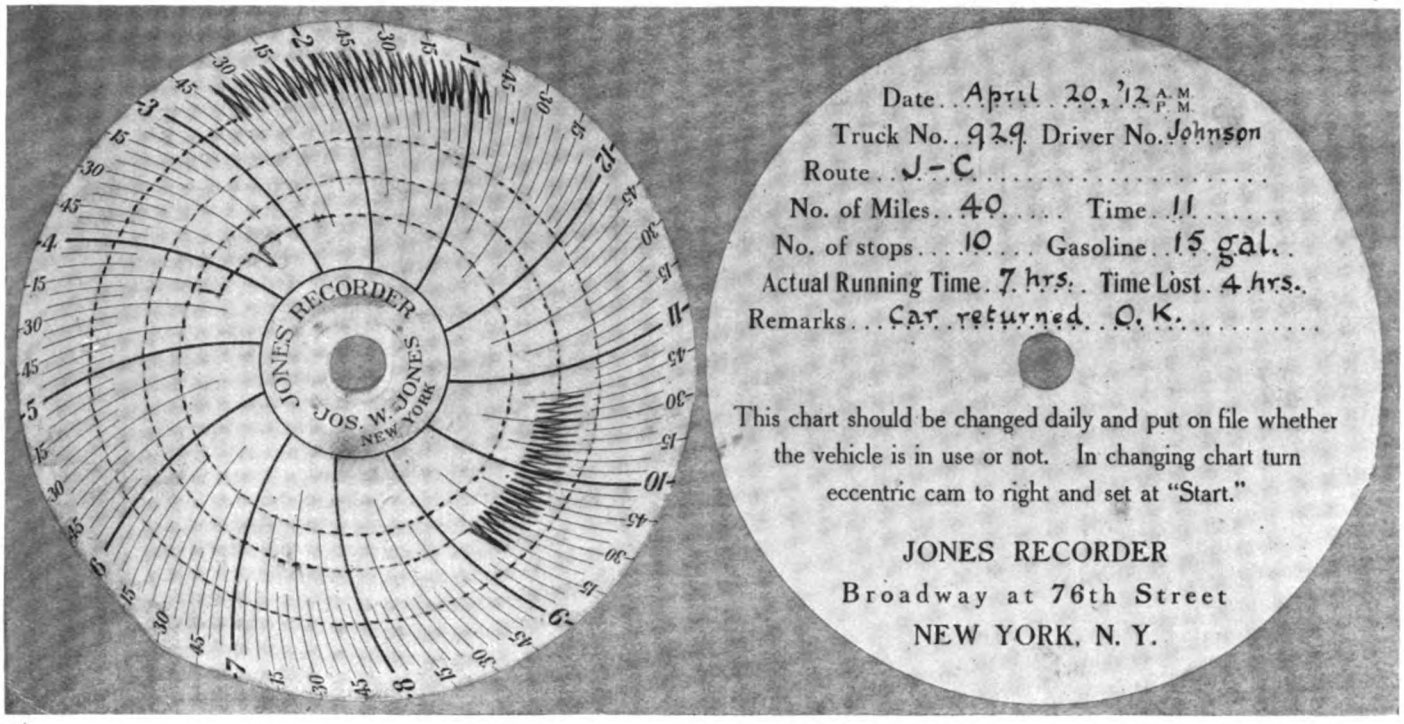
JONES RECORDER
JOS. W. JONES
NEW YORK
Date. April 20, '12 A.M. P.M.
Truck No. 929 Driver No. Johnson
Route. J-C
No. of Miles. 40 Time. 11
No. of stops. 10 Gasoline. 15 gal.
Actual Running Time. 7 hrs. Time Lost. 4 hrs.
Remarks. Car returned O.K.
This chart should be changed daily and put on file whether the vehicle is in use or not. In changing chart turn eccentric cam to right and set at "Start."
JONES RECORDER
Broadway at 76th Street
NEW YORK, N. Y.

Front and reverse sides of the time record card, with pencil marks inked in.

10-ton truck is assigned one helper, who receives an average of $15.00 per week. During the winter months a truck is very frequently driven from 12 to 18 hours a day, and for this extra work both driver and helper are paid according to the following schedule:

Up to 9:00 p. m.—day rating.
After 9:00 p. m.—1½ times day rating.
Sundays—double day rating.

When the machines are laid up in the spring, it is necessary to let out the drivers and helpers, who readily find work during the summer months as chauffeurs on pleasure cars, but when the fall rush opens up, it is not unusual to have the majority of the old drivers back ready for their positions.

* * *

How the Records Are Kept.

Another illustration shows the driver's daily record card. The night mechanic at each garage fills out this card with the date, garage name, the machine number, the driver's and helper's name, the amount of gasoline and oil supplied, and leaves the card on the machine. When the driver reports in the morning, he receives instructions from the foreman to proceed to a certain coal yard, where he is given his first load. At the yard he fills out the card with the yard name, the tonnage, the address to which the coal is to be delivered, and the time of leaving. He also receives orders covering the loading point for the next delivery. The card is turned in at night to the garage foreman, and furnishes a complete record of the day's work, together with a basis for obtaining the portion of delivery costs, which are chargeable to each coal yard.

The machines are equipped with time recorders, which furnish a valuable record of the day's work and one that is not in any way influenced by the driver's imagination. The chart shows the time the truck leaves the garage, the number and duration of all stops, the actual mileage covered, and the time the car returns to the garage.

* * *

Daily Operating Expense for a 10-ton Truck.

The following figures are vouched for by the Burns Coal Company, and form the basis on which the motor and horse service are compared:

Depreciation and interest	$6.17
Garage—$35 per month	1.17
Gasoline	1.95
Oil	.56
Driver	3.39
Set aside for tires and repairs	5.00
	$18.24

Daily average: 8⅞ trips, 93 tons delivered, 32⅓ miles average haul, 13⅓ gallons of gasoline, and 1¼ gallons of oil.

Cost for delivery, 20 cents per ton, average run two miles from yard. The tires last 7½ calendar months, in-

Type of 5-ton Mack used by Burns Bros.

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cluding two months night work, making a total of 9½ months.

Saving over horse delivery about 50 per cent in winter.

Saving over horse delivery about 30 per cent in summer.

* * *

Tire Equipment, and Other Particulars.

The 10-ton trucks are equipped with 36-inch dual, 5-inch block, Kelly-Springfield tires on the front, and 44-inch dual, 7-inch block, Kelly-Springfield tires on the rear. These tires are guaranteed for 5,000 miles, and cost $1,-260 (to the Burns Company) per set. A set will finish out a winter in fairly good condition, but deteriorates in the summer, and wears out rapidly during the first month of the next fall. The 10-ton machines are governed to 7½ miles per hour.

The 3-ton machines are equipped with 34 by 5-inch single tires on the front, and 34 by 4, dual, 4-inch block tires on the rear.

The machines are insured against fire and liability. Fire rate is two per cent, and liability rate is nine-tenths of one per cent.

There have been very few accidents of any kind. Mr. Burns attributes this to the fact that the truck is very large, runs slowly and makes a big noise.

At each yard there is maintained a stable for a part of the horse equipment, and the necessary wagons and supplies. The horse vehicles operate in the vicinity of the yard at which they are stabled.

MAY MEETING OF THE MOTOR TRUCK CLUB.

This was held at the Automobile Club of America, on May 15 last. Many of the members took advantage of the excellent informal dinner served previous to the regular club meeting. A report from the Grand Marshall (Edward W. Curtis, Jr., of General Vehicle Co.) was read, outlining suggestions for conducting future parades in order that the line of march might remain unbroken or rather less so than in those of the last two years. The Finance Committee reported that the receipts from the parade were in excess of the expenditures, and the treasury was therefore in a healthy condition. A letter from the Manufacturers' Association and Board of Trade was read in which they requested information as to the club membership, its aims and results of its work—evidently with the intention of united action. After the dinner, Mr. Kennedy's paper on "Scientific Salesmanship in the Commercial Motor Car Field" was read by him (this was the same paper Kennedy read before the S. A. E. last summer at Dayton), and a great deal of interesting discussion followed which showed many divergent ideas.

NO SHOW FOR C. A. T. A.

The South Park Commissioners in Chicago have refused permission to the Chicago Automobile Trade Association for holding a motor wagon show in Grant Park during August. This is a great pity, for some progressive publicity and educational work was being planned in connection with this exhibition.

N. A. A. M. SHOW DECISIONS.

The most important item of public interest growing out of the last monthly meeting of the National Association of Automobile Manufacturers was the determination of the association to form a circuit of local shows.

For the last two months work has been progressing with a view to curtailing the number of local shows, which have grown beyond all reasonable bounds, or of enabling the manufacturer to resist the demands made upon him. Under the rules of the association, no manufacturer, as such, may take part in a local show, but in the event that his dealer takes space he may send his show chassis, salesman or salesmen, literature and contribute to the advertising. With upward of 70 local shows in the field the manufacturers found the call upon them too severe a burden.

The association will not attempt to prevent the holding of any local show, but it will form a circuit embracing the principal cities, so arranging dates that they will not conflict and that each show in the circuit will be assured of a reasonable amount of co-operation on the part of the manufacturers. It is quite conceivable that under these circumstances manufacturers will deem it advantageous to confine their attention to circuit shows almost exclusively. The show committee will, in the near future, invite the show promoters in a number of cities to meet for a full discussion of the plans.

It was decided to organize a distinct electric vehicle section at the Chicago show. Ten of the choicest spaces in the First Regiment Armory will be devoted to electric vehicles exclusively, and allotment of space in this section will be made by, or under the supervision of, the electric vehicle committee of the association.

U. S. ARMY MOTOR TEST.

The U. S. Army will conduct its most important motor wagon test, up to date, during June and July. Twelve motor wagons, six of 3 tons capacity and the same number of 1½-ton machines, will leave Dubuque, Iowa, on June 10 and finish the run at Sparta, Wis., some time in July. They will take part in the march and maneuvers of a regiment of infantry at war strength. Captain Alexander E. Williams, of the 19th Infantry, will be in charge of the machines, which represent the product of several manufacturers.

MOTOR TAXES IN CHICAGO.

The Chicago City Council, unawares to the motorists who were supposed to be watching for such a move, has adopted a new wheel tax, as follows:

Passenger cars under 35 hp	$10
Passenger cars over 35 hp	20
Electric passenger cars	10
Motor trucks, 1 ton or less	15
Motor trucks, over 1 ton	30

New registrations of motor wagons from January 1 to May 1 this year number 9,353. Of these, 8,500 are gasoline machines and 853 are electrics.

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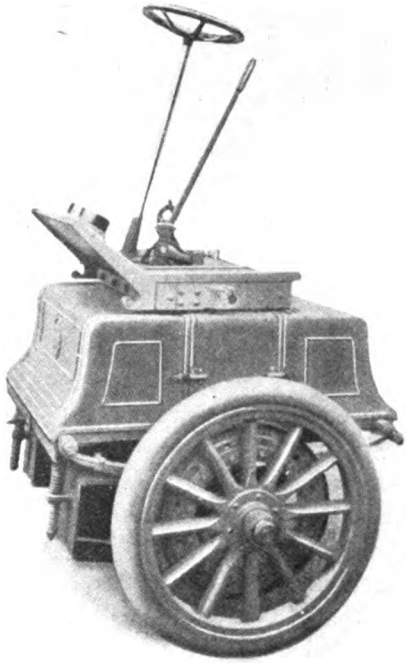
Motor Garbage Wagons.

Two Interesting Types of Front-Driven Machines Being Tried Out in Paris, France.

THE MUNICIPALITY of Paris, France, is making an interesting experiment in the way of using power wagons for collecting household waste. In order to find out which is the type best adapted for such special use, both gasoline and electric machines are under trial. The city took charge of building the box body of large size for holding the waste, and, as will be noticed, it is quite independent of the front truck and this can be uncoupled at short notice. One front truck is laid out on a storage battery system with the use of an electric motor against each wheel, while the second design uses a gasoline motor.

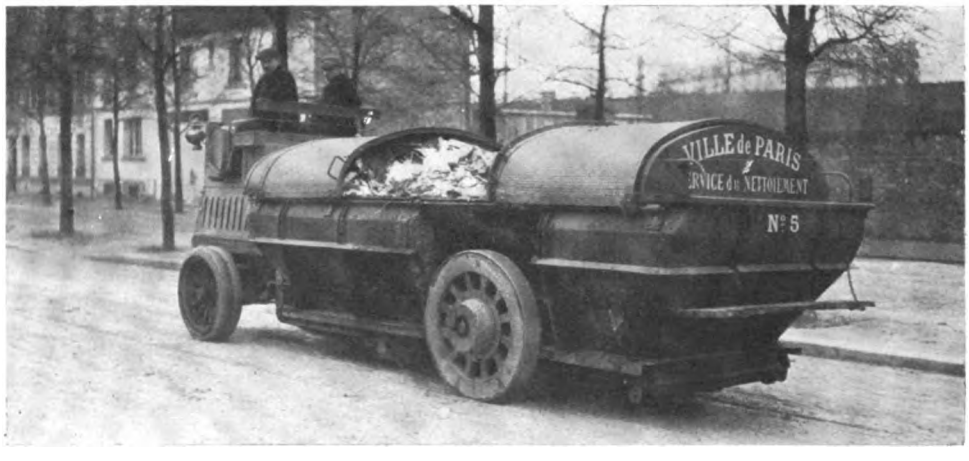
The details about the storage battery truck and power wagon were furnished by the makers, the F. R. A. M. Company of Paris. Such wagons are required to work under the same general conditions as are now filled by the horse and wagons, that is, to collect the waste from the large galvanized iron boxes which, according to city regulations, are set out on the curb in front of each house at an early hour in the morning. Most of the houses in Paris are apartment houses which usually have no access at the rear, so that the local conditions led to the present method of organizing the waste collecting, and on the whole the result is a very good one. One somewhat unusual requirement for the power wagons is that they are not only obliged to run at very slow speed during the collecting hours, but must stop in front of each house for the dumping in of the waste. The stop, however, is a very short one, as the emptying is done quickly. After the collecting has been done and the wagon is filled, the machine can then be run at higher speed to its destination and without stopping.



The "avant-train" F. R. A. M. electric truck or tractor.

The F. R. A. M. storage battery front truck was first brought out in Italy, and is intended for coupling on to any kind of power wagon body. The company which is taking it up in France states that there are now more than 200 machines of the kind now in use in the north of Italy. It is claimed that there is a great advantage in the use of electric drive for heavy work, and that it will not be long before this is generally recognized in Europe. Without going into this question, it is clear that for this special case of slow speed running and frequent stops, the electric method is likely to have an advantage. Whether this is true or not will be shown up later after the results of the tests with the two kinds of wagon have been tabulated.

Coming now to a description of the machines themselves, the box body mounted on a single axle is built of angle irons and sheet iron, and has a sliding cover in four sections made of embossed iron plate. In this way only a small part of the body need be opened at a time and when one part is filled up the next part is opened. The covers slide upon an iron rod running from front to back on each side and are easily handled. Including the front truck, the wagon is 6 meters long (20 ft.) over all, and the width of the box part is 2 meters (6.5 ft.). The wheelbase is 3.6 meters (12 ft.). The cubic content of the box part is 8 cubic meters, or about 240 cu. ft., representing a weight of material carried equal to 4½ or 5 tons. According to the present requirements, the wagon makes a daily run of 21 miles, in which the actual collecting of the waste counts for 4 or 4½ miles, and at this time it runs at very slow speed in front of the houses, with stops before each house. The wagon is designed so that it is able to turn about entirely within a space of 40 ft., owing to the use of an effective method of steering, which is a part of the electric truck design. It will be noticed that the F. R. A. M. truck secures the advantages which are due to the use of a separate electric motor placed adjacent to each wheel so that each motor is independent. In order to turn the wagon, a switch is used on the field



Gasoline type of front-driven motor garbage truck now being tried out in Paris, France.

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winding of each motor. These switches are mounted conveniently on the steering wheel, and one motor is slowed down while the other is run at higher speed, so that the wagon is turned in this way.

When the wagon has finished its trip for the waste collecting and is fully loaded, it is run at the top speed (8 miles an hour)to the garbage burning plant, and here it is brought over a trench and the waste is discharged by opening up the sheet iron gates which form the wagon bottom. The electric motor is of the 6 hp. size, of inclosed type, and has the front end lying about flush with the fore end of the truck, with a double spring suspension at this point, while the pinion of the motor at the inner end engages with a large gear ring bolted on to the inner side of the wheel. The truck carries a small box body containing the storage battery, this consisting of 45 cells of the French Tudor type, one of the well-known makes. This battery delivers the standard voltage of 90 volts to the motor and is used in connection with a small and simple controller. One point to be noticed is the use of a controlling device specially made for the waste-collecting wagon, and this allows the machine to be controlled from the side when at slow speed while the driver is standing on the pavement. In this way the driver can aid in loading up, and this is likely to reduce the number of men needed for the crew. The total weight of the F. R. A. M. power wagon when empty is 6.2 tons.

Electric type of front-driven motor garbage truck now being tried out in Paris, France.

There is another kind of box body which is adapted for use with the electric front truck so as to serve for hauling purposes of the usual kind. Here the load capacity is about 5½ tons. The box can be tipped up very readily by means of steel cable working on pulleys and operated from the driver's seat. One point which should be mentioned in connection with municipal service is that the front truck is readily interchangeable so that in the morning it can serve for waste collecting and in the afternoon for street-sweeping and sprinkling trucks. In France and elsewhere the use of motor driven sprinklers is now coming into use, and the present combination would appear to be a still further improvement.

The second type of power wagon for collecting household waste is laid out on quite the same lines as the one just described, and there is practically no difference in the back portion or main box body for holding the waste, including the axle belonging to this part. The front truck is also made so as to be quite independent of the box body, but in this case the gasoline system is used instead of the electric. The present power wagon is built conjointly by the city and by the Chas. Blum construction firm of Paris, and the front truck furnished by the latter is designed after the principles which were brought out some years ago in the Latil fore-truck. It can be attached to any suitable kind of rear wagon body. The following points about the truck were furnished by the Blum company.

On the top is a double seat for the driver and helper, and underneath is the main portion of the truck in which is contained the motor and driving gear including the differential drive to each of the wheels. The motor is of the 4-cylinder type with the cylinders mounted in pairs. Cylinder diameter is 110 millimeters (4.4 in.) and stroke 140 millimeters (5.6 in.). Speed 1,000 resolutions per minute. A gear-driven pump secures lubrication under pressure. Ignition is carried out by magneto at high tension. For the cooling there is employed the usual pump together with radiator and air fan. Three speeds are used with a reverse drive. From the motor, a differential drive of special design leads to each of the wheels. The present wagon can make a speed of 9 miles an hour at the maximum drive on level road.

MOTOR WAGON FOR ROAD REPAIR.

The commissioners of Lyon county, Kansas, have a motor truck which will be used as tractional power for grader, drags and roller in the improvement of the county roads this year. In trial tests the machine has given satisfaction. The county has a fund of $39,000 for expenditure on the roads between trade centers.

MOTOR MAIL IN COLORADO.

A motor mail delivery route is to be put in at Olathe. Olathe is one of the first Colorado towns to have such a delivery on its rural route.

A NEW BUSINESS.

Painting delivery wagons and motor trucks is the new and exclusive business of a concern recently formed in Lincoln, Neb.

Starke Bros., Red Cloud, Neb., have bought a motor plow which turns 45 inches of soil at a time, and having attachments for operating a cornsheller, etc. It weighs 4½ tons.

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Motors in Telephone Service.

How the New York Telephone Company is Taking Advantage of Motor Wagon Economy.

By A. W. ALLEN.*

BACK IN 1901, when the New York Telephone Company's field of operation comprised Manhattan, the Bronx, and Westchester, the construction department put in service the first motor vehicle owned by the company. This was an electric, manufactured by the Vehicle Equipment Company, of 10,000 pounds' capacity, equipped with two 1¾ hp. motors for propelling the truck, taking current from a lead battery; and another motor of 2 hp. taking current from the same battery for operating a "nigger head" used for pulling cable into the subway. This was before the time of extensive aerial cable construction work, so that in the design of the pulling device, only the condition met with in underground work had to be considered. This machine remained in service until 1907.

From 1905 to 1909, three more electrics were purchased; two of 2,000 pounds' capacity and one of 3,000 pounds' capacity. These were of the Lansden make, equipped with Edison batteries. All three are still in the delivery service of the repair shop.

In 1907, the construction department in New York put in service the first gasoline wagon owned by the company. This was a Hewitt of 10,000 pounds' capacity and equipped with a Higbie hoisting winch geared to the truck engine. This machine has a splendid record and is still in service.

The developments and economies resulting from the use of the Hewitt truck in Manhattan, the Bronx and Westchester, in both underground and aerial cable work, created a demand for motor trucks throughout the company's territory which at this time included the old New York Company operating in Manhattan, the Bronx and Westchester, and part of Connecticut, and the merged companies operating throughout the remainder of the state of New York, and a part of the state of New Jersey. This demand was due largely to changes in outside construction methods involving a more general use of aerial cable. The amount of this work under way and contemplated, made it apparent that a limited number of machines equipped with power winches could be kept continually busy for a number of years. In the fall of 1910, a careful study was made to determine the number of motor wagons required in each plant division, considering only their installation where continual use and a saving in man labor would insure greatest economy. This study led us into a consideration of motor vehicles, not only for cable construction, but for all other lines of telephone development and maintenance work.

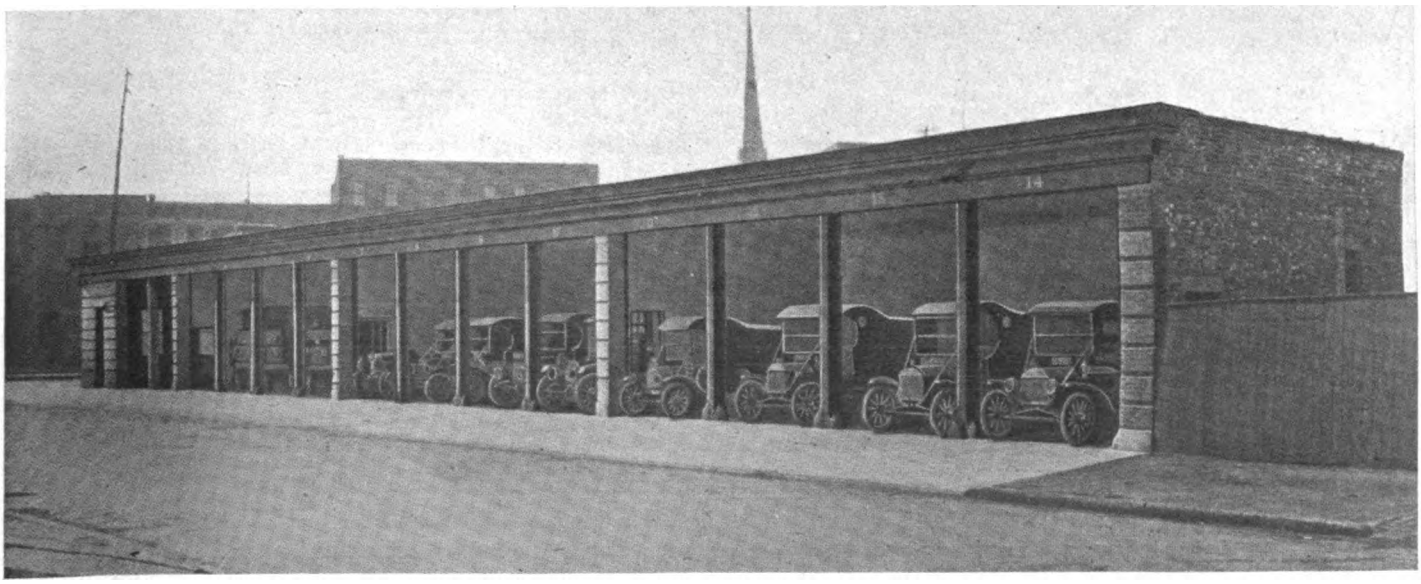
The transportation problem of the telephone company is made up of a number of fairly distinct elements: (a) The transporting of heavy construction material; (b) the use of a truck equipped with a power winch as a tool in erecting poles and placing lead covered cable in the plant; (c) the transporting of loop gangs with their tools and equipments; (d) the delivery of splicers' supplies; (e) the delivery of subscribers' station apparatus; (f) the distribution of repaired material from the shop.

* * *

Cable Construction and Maintenance.

Over a period of several months, records were maintained of loads carried by horse-drawn trucks both in underground and aerial cable work. These records showed that the average load was about 5,000 pounds, although in a number of cases 8,000 pounds were carried, and in other cases, two trips of a horse-drawn truck were necessary where one trip of a large capacity motor truck would have proven more economical. These cases, however, were infrequent enough to show that on the average a truck to meet the maximum condition would go out loaded to about half of its capacity, and the cost of maintenance, as against

*Mr. Allen is the Superintendent of Buildings and Supplies of the New York Telephone Company. This instructive article is reprinted from The Telephone Review, by special permission. We are also indebted to the same journal for the illustrations.



New York Telephone Company's Brooklyn garage, of brick and terra cotta, with steel rolling curtains in front.

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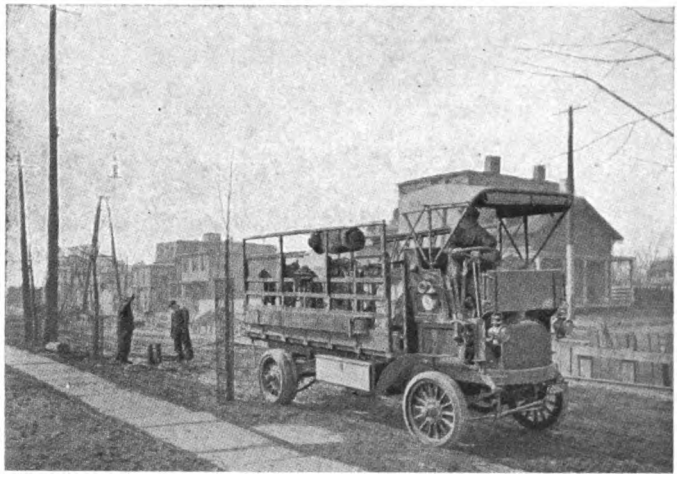

Placing underground cable. The driver has just received the signal to shut off power on the completion of the pull.

a truck which would more nearly meet the average condition, was so much higher as entirely to offset this saving in carrying the occasional heavy load. We therefore decided that a truck of 6,000 pounds' capacity would best meet our requirements, and that it must be equipped with a power winch and a strongly built body of special design.

* * *

Delivery of Supplies and Station Equipment.

In this study, the requirements were radically different from those met with in a consideration of construction work. The trucks would be used in the delivery of subscribers' equipment and splicers' supplies, and in the transportation of loop gangs with their tools and equipment. No winch was required in this service, and the economy in transporting heavy loads was offset by the larger economy to be obtained through the greater speed of a truck of small capacity. It was very much more difficult to determine the proper carrying capacity for this service, because in suburban territory, the truck in addition to transporting the gang would be required to carry subscribers' equipment, wire, miscellaneous material and tools, the weights of the load varying with the outside plant facilities and the installations to be made in one day.

Again, in city work, where block and house cable facilities are provided in advance, the only material to be delivered by truck is subscribers' equipment and inside wire. The driver of the truck would be required to make the delivery. In this work the congested traffic conditions precluded the possibility of high mileage, and the nearness to the base of supplies made it unnecessary to consider a truck of greater capacity than was required for one day's deliveries.

In the delivery of splicers' supplies to the man on the job, the size of the truck to be used as between one of 2,000 pounds and 4,000 pounds is problematical, depending largely on the number of men to be served, the radius of operation, the distance from the supply base and the weight of load for one day's deliveries.

STATEMENT "A"

COMPARISON OF MOTOR VEHICLES WITH HORSE-DRAWN VEHICLES

Detail of Operating Expense and Saving Made by Three-Ton Trucks Used by Cable Placing Dept.

Annual Operating Expense Three-Ton Mack Truck Based on Performance of 10 Trucks, Average 10,900 Miles	
Chauffeur's Salary (full time including overtime)	$1146.50
Garage and washing	240.00
Gasoline (.0365 per mile)	397.85
Lubricants (.0171 per mile)	186.39
Tires (.055 per mile)	599.50
Supplies (Miscellaneous)	54.50
Repairs	240.00
Depreciation, interest and taxes	1020.50
Total	$3885.24

Approximate Gross Annual Saving on Horse-Drawn Vehicles Replaced by Three-Ton Mack Truck Based on 7 Months' Usage	
Truck hire (Aug. to Feb.)	$2904.20
Carfare (Aug. to Feb.)	361.69
Freight (Aug. to Feb.)	118.00
Total 7 months	$3383.89
Approximated annual saving	$5800.00
Approximated annual saving on placing cable	500.00
Total	$6300.00

Approximated gross annual saving by three-ton Mack Truck	$6300.00
Annual operating expense of three-ton Mack Truck	3885.24
Net annual saving per Truck	$2414.76

STATEMENT "B"

COMPARISON OF MOTOR VEHICLES WITH HORSE-DRAWN VEHICLES

Detail of Operating Expense and Saving made by Three-Ton Trucks Used by the Heavy Aerial Construction Gangs

Annual Operating Expense Three-Ton Mack Truck Based on Performance of 7 Trucks, Average 5,310 Miles.	
*Chauffeur's Salary (part time)	$360.00
Garage and Washing	240.00
Gasoline (.0625 per mile)	331.87
Lubricants (.0325 per mile)	172.57
Tires (.055 per mile)	292.05
Supplies (Miscellaneous)	54.50
Repairs	120.00
Depreciation, Interest and Taxes	750.00
Total	$2320.99

Approximated Gross Annual Saving on Horse Drawn Vehicles Replaced by Three-Ton Mack Truck.	
Teams for Hauling Men, Tools, etc.	$1450.00
Placing Cable	350.00
Extra Truck for Hauling Poles	150.00
Extra Truck for Hauling Cable	300.00
Traveling Time of Men	1200.00
Labor Setting Poles	300.00
Total for year	$3750.00

Approximated Gross Annual Saving by Three-Ton Mack Truck	$3750.00
Annual Operating Expense of Three-Ton Mack Truck	2320.99
Net Annual Saving per Truck	$1429.01

*The Chauffeurs operating these trucks are experienced linemen and work with the gang when trucks are standing idle; hence part of their expense is properly chargeable to the work.

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STATEMENT "C"

COMPARISON OF MOTOR VEHICLES WITH HORSE-DRAWN VEHICLES

Detail of Operating Expense and Saving made by One-Ton Truck Used to Supply Material to Splicers.

Annual Operating Expense One-Ton Mack Truck Based on Performance of 15 Trucks, Average 10,300 Miles.

Chauffeur's Salary (Including Full Time and Overtime)	$864.00
Garage and Washing	216.00
Gasoline (.018 per mile)	185.40
Lubricants (.008 per mile)	82.40
Tires (.026 per mile)	309.00
Supplies (Miscellaneous)	52.50
Repairs	150.00
Depreciation, Interest and Taxes	599.00
Team Hire on Account of Truck	236.00
Total	$2694.30

Aproximated Gross Annual Saving on Horse-Drawn Vehicle Replaced by One-Ton Mack Truck in the New Jersey Division.

Newark, Material Wagon per day	$5.25
Orange, Material Wagon per day	5.00
Clerk on Newark Wagon per day	2.00
Clerk on Orange Wagon per day	2.00
Total per day	$14.25
Total per year 290 days	$4132.50
Additional Truck Hire for Special Work	30.00
Total	$4162.50

Approximated Gross Annual Saving by One-Ton Mack Truck		$4162.50
Annual Operating Expense One-Ton Mack Truck	$2458.30	
Team Hire	236.00	2694.30
Net Annual Saving		$1468.20

A final analysis of this service indicated that for classes (c) and (d) a truck of 2,000 pounds' capacity would meet the average condition and that for class (e) a truck of 800 pounds' capacity should be used.

* * *

Distribution of Repair Material.

It proved less difficult to determine the repair shop's requirements because the Lansden electrics had been in that service for a number of years and we knew what conditions were involved. When these electrics were put in service, the shop served only the storerooms and central offices in Manhattan, the Bronx and Westchester. With the merging of the New York and New Jersey Telephone Company, taking in Long Island and a part of the state of New Jersey, it was found more economical to close the shops which were maintained in Brooklyn and Newark and serve the entire territory from the shop in Manhattan.

This wider field of operation necessarily changed entirely the method of shop deliveries. The Lansdens had proven very satisfactory in the congested sections of Manhattan, but their limited daily mileage and speed made it uneconomical to send them on the longer hauls into Long Island and New Jersey. Our study indicated that the operations of electrics should be confined to the downtown sections of Manhattan and Brooklyn; that 2,000 pound gas trucks should be used for longer hauls where daily deliveries were required; and 4,000 to 6,000 pound gas trucks for the longer hauls where tri-weekly service would meet the plant requirements.

After determining the requirements for all of the trucking conditions which we intended to consider at that time, we placed orders with the Mack company for: 17 trucks of 6,000 pounds' capacity, equipped with power winches; 1 truck of 4,000 to 6,000 pounds' capacity; and 15 trucks of 2,000 pounds' capacity.

Later an order was placed with the Ford company for ten 800-pound delivery wagons.

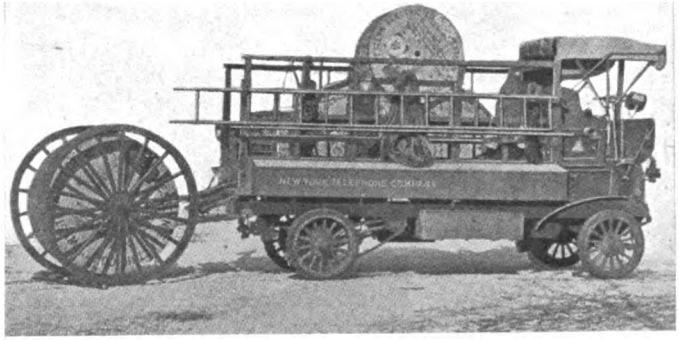
All of the trucks other than the 6,000-pound type were to be of standard design. The 6,000-pound trucks were to be equipped with power winches and body of special design. These bodies were to be of two types, one arranged with locker compartments extending over the wheels outside of the loading space which was narrowed down to 5 feet; the other with all of the available space in the clear giving a loading platform 6 feet wide by 13 feet long. The winch specification required two speeds, one of from 20 to 40 feet per minute for loading and unloading heavy reels; and another from 40 feet to 175 feet per minute for pulling in underground and aerial cable. The construction of the winch mechanism must be such as to permit of reverse, in order that at the completion of a cable pull, while tension is still on the pulling line, the drum may be released to allow of the removal of the cable grip.

The manufacturer met all of these conditions by taking advantage of the internal clutch type of sliding gear transmission. Another lever was provided in addition to those used for operating the truck so that with the transmission in neutral, the operation of this lever would prevent the clutch from engaging the pinion driving through the bevel gears. The intermediate and low speeds and reverse of the transmission could then be applied to the winch through the extension of the jackshaft of the transmission to a worm-driven jackshaft under the winch, thence by chain drive to the winch drum. The winch is controlled from the driver's seat, and the speed may be varied at will through throttling down or up.

* * *

The 6,000-pound Winch Truck in Service.

The use of this truck is peculiar to the telephone business in that the actual trucking problem is complicated through the necessity of adapting the truck to the hauling of supplies, and when destination is reached, its utilization on the job as a tool in the hands of the plant workmen. The power winch makes it comparatively easy to place a reel of cable 6½ feet in diameter and weighing



The trailer increases the total capacity of the truck to more than 10,000 pounds.

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DEPARTMENT Repair Shop — AUTOMOBILE No. 23
DIVISION Metropolitan — DATE IN SERVICE May 1911

NEW YORK TELEPHONE COMPANY

MONTHLY AUTOMOBILE ANALYSIS REPORT FOR YEAR 1911

MAKE Mack — COST OF CAR
TYPE 2-Ton Truck — COST OF APPURTENANCES

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
SALARY & WAGES.					133 10	136 00	130 82	134 16	129 57	140 53	132 98	133 67	1070 83
GARAGE AND WASHING.					22 50	25 00	25 00	22 50	25 00	25 00	22 50	26 00	193 50
GASOLINE (CAR OPERATION.)					35 20	41 40	33 92	31 36	33 92	31 00	36 88	46 37	290 05
(WINCH OPERATION.)													
LUBRICANTS (CAR OPERATION.)					20 55	23 08	19 20	17 70	18 41	19 43	17 06	19 55	154 98
(WINCH OPERATION.)													
TIRES (BASED ON MILEAGE.)					43 35	64 65	49 50	54 10	49 30	49 25	46 95	51 95	409 05
REPLACEMENT OF APPURTENANCES.							5 00		2 75			2 25	10 00
SUPPLIES (MISCELLANEOUS.)					*15 20	3 25		1 50		32	2 31	**12 67	35 25
REPAIRS TO CAR (ROUTINE.)					8 10	13 01	8 39	10 16	57 05	35 09	55 81	68 57	256 18
(ACCIDENT.)													
REPAIRS TO WINCH (ROUTINE.)													
(ACCIDENT.)													
DEPRECIATION, INSURANCE AND SUPERVISION.					59 84	58 97	59 04	58 67	55 39	62 21	63 50	63 02	480 64
MONTHLY OPERATING COST.					337 84	365 36	330 87	330 15	371 39	362 83	377 99	424 05	2900 48
OPERATING COST PER DAY IN USE.					12 99	14 05	15 04	12 23	14 85	13 95	15 74	16 96	14 43
OPERATING COST PER MILE.					389	282	334	305	376	368	401	408	354
COST GASOLINE PER MILE.					04	03	034	03	034	031	039	045	035
COST LUBRICANTS PER MILE.					02	018	019	02	018	019	018	018	018
COST TIRES PER MILE.					05	05	05	05	05	05	05	05	05
TIRE PURCHASES AND REPAIRS.					-	-	-	-	-	209 48	-	-	209 48
INTEREST ON INVESTMENT.					16 30	15 97	15 75	15 47	15 19	14 92	14 64	14 37	122 61
NUMBER DAYS IN USE.					26	26	22	27	25	26	24	25	201
NUMBER DAYS LAID UP FOR REPAIRS.					-	-	-	-	-	1	-		1
NUMBER DAYS IDLE BUT SERVICEABLE.					5	4	9	4	5	4	6	6	43
AVERAGE DAILY MILEAGE.					33	49	45	40	59	38	39	42	41
MONTHLY MILEAGE.					867	1293	990	1082	986	985	939	1039	8181
MILES PER GALLON GASOLINE.					3.75	4.67	4.38	5.17	4.36	4.75	3.81	3.36	4.23
MILES PER GALLON LUBRICANTS.					25.60	34.01	30.91	37.30	31.80	30.78	34.77	31.46	31.95

REMARKS.— NOTED

* $15.00 Registration Fee
** $10.00 " "

The above figures apply to 2 to 3 Ton Trucks. Salary and Wages item includes 2 men.

2½ tons, on the truck. When the reel is transported to the job, the winch is again used in pulling the cable into the subway or aerial rings. The first saving involved is one of labor in loading; the second, the greater speed of the power truck in getting to destination; and the third, a saving of labor in finally placing cable in the plant.

A very interesting comparison may be drawn between the truck used continually in extensive aerial or underground construction work, and the truck assigned to a definite area within which it will be used for handling the construction jobs and the repairs and replacements incident to the upkeep of old plant.

In the first case, we will take the actual records of the work done by a 6,000-pound winch truck in delivering and placing in the plant 35,391 feet 30-pr. No. 19-gauge and 600-pr. No. 22-gauge underground cable:

Delivery from freight station to job:
79 reels—total weight 153½ tons.
Number of miles traveled—190.
Cost of delivery per ton—$0.84.

Pulling into the subway:
Number of sectoins—95.
Average number of sections pulled per day—12.
Average number of feet pulled per day—4,464.
*Average winch cost per foot—$.00275.

Returning empty reels to freight station:
79 reels returned.
Number of miles traveled—90.
Average cost per reel—$0.93.

*This figure includes all fixed charges on the truck. To be more exact, we should eliminate depreciation on body and frame and tire charges, as the winch is used while the truck is standing idle.

We have a number of trucks that are used continually in the service as outlined above. The average mileage of such trucks is approximately 11,000 miles per year; that is, the truck is used as a truck more than 50 per cent of the time, and the saving involved is largely in the cost of trucking as compared to a horse-drawn truck. Statement "A" gives the estimated yearly operating cost and saving based on actual records of seven months' use.

In the second case cited, the truck covers approximately 5,300 miles per year, or to express it in different terms, in a working day of nine hours, it is traveling only 22 per cent of the time. In the territory where such trucks are used, transportation facilities are relatively poor, so that there is a decided economy in having the gang report at headquarters where the truck is to be loaded in the morning, and ride with the truck to the job. Such trucks may cover anywhere from one to five jobs in a day, the men in every case traveling from job to job with the truck. The truck is utilized on the job pulling in cable, carting and setting poles, and necessarily stands idle more of the time than in the first case cited, as it acts more as a utility tool in the hands of the workmen, than as a truck.

Statement "B" estimates the total cost of operation for such a truck over a period of a year and the estimated sav-

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ing based on actual daily records maintained over a period of about seven months.

In Statement "A" depreciation is based on a 5-year life. In Statement "B," depreciation is conservatively based on an 8-year life. It is clear from a study of the statements, that because of the smaller mileage, it would be fair to assume that depreciation should be nearer 10 per cent per year than 12½ per cent as is figured.

In the first case cited, it is very easy to determine whether or not the installation of a power truck will effect economies. In the second case cited, territorial and operating conditions must be studied more carefully; otherwise a power truck which is apparently doing good work may be costing more than a horse-drawn truck.

Studies made along these lines in a large percentage of the cases show that the use of the power truck proves more expensive than the use of the horse-drawn truck.

One of the most interesting developments which have followed the use of the winch truck has been the installation of a derrick for setting poles. Whereas the old method required from six to eight men, and a time element of from 10 to 20 minutes per pole, the new method requires the services of only two men to hold the butt of the pole in position, while the chauffeur operates the winch in lifting the pole and dropping it into the hole; the time element in this case being from 2 to 5 minutes, or in other words, the cost of setting the pole is practically eliminated.

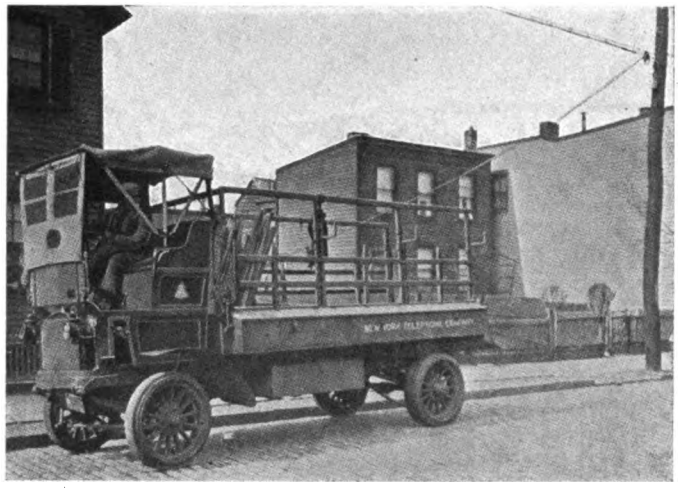
A satisfactory hole digger to be used in conjunction with this pole derrick is one of the anticipated developments which will materially reduce the expense of building pole lines.

* * *

The 2,000-pound Truck in Service.

In parts of our territory, where we have extensive underground plant, the 6,000-pound truck is used for delivering and pulling in underground cable. After this has been accomplished, the splicing forces are employed in connecting up section lengths and cutting cable into service. The 2,000-pound truck is used as a traveling storeroom, going from job to job, furnishing each splicer with tools, solder, paraffin, lead sleeving or other supplies as may be required for carrying on the work. This service has effected a considerable saving over the horse wagon delivery.

Aerial cable passing into the rings as the winch takes in the pulling line at the other end of the section.



Placing aerial cable by power winch.

Statement "C" shows the average operating cost of the 2,000-pound truck. The gross saving effected represents the actual amount of money expended for hired wagons and clerical labor prior to our purchase of power trucks.

We are not prepared, at this time, to furnish detailed figures on the saving effected through the use of the 2,000-pound truck in aerial loop work. In fact, we have not in any case replaced horse trucks where the entire time of a power truck would be required. We are using eleven 2,000-pound power trucks, where part time is given to loop work and part time to the delivery of pole line hardware, wire and miscellaneous material, used in the aerial plant; in every instance these trucks have been installed where there was no doubt as to the saving to be effected. I might cite a case in the Long Island division where two 2,000-pound trucks replaced four horse-drawn trucks in handling this combination work, effecting a net saving in truck hire and labor combined, of $2,900 per year.

* * *

The 800-pound Delivery Wagon in Service.

Prior to the time when a satisfactory motor wagon could be secured at a reasonable cost, the most economical plan of handling subscribers' installations was to have the installer carry with him to the job the apparatus to be used. This necessitated the workman reporting at the storeroom each morning to get his equipment and returning there during the day as apparatus was required for other installations. It is quite apparent that, in handling installations in this manner, much time was lost by workmen in traveling from storeroom to the job and returning to the storeroom when additional material was needed during the day.

By relieving the installer of carrying material, or by reducing the time required in this particular phase of the work, more of his time could be applied to the actual in-

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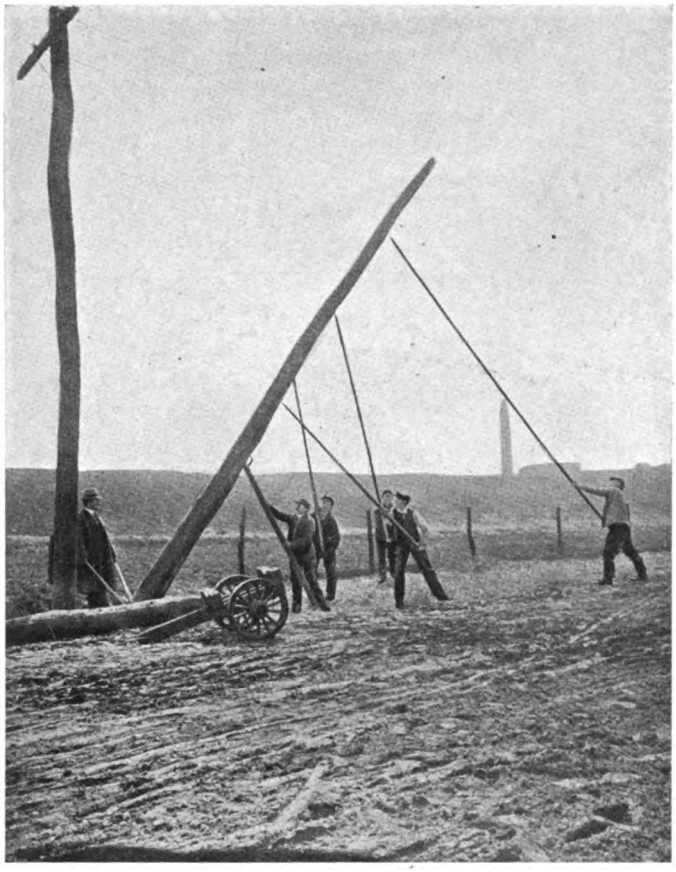

Hoisting poles by manual labor—the old way.

stallation. This result had been partially accomplished in the past through having six retail storerooms on Manhattan Island—the installation forces operating by districts, the nearest storeroom as district headquarters.

In utilizing power wagons for delivering equipment directly to the subscribers' address, the first economy effected is through cutting down the installer's traveling time, as, instead of reporting to the storeroom in the morning, he reports directly to the subscriber's address where the installation is to be made. The second economy is effected through closing the six retail storerooms and making deliveries from one central point, and by this centralization reducing the supply investment. The third economy is the result of operating a centralized minor repair shop in conjunction with the storeroom. When six storerooms were operated, it was necessary to make minor repairs to apparatus recovered within each of the six storerooms. With centralization, the volume of repairs at once became great enough to prove in piece work, thus effecting an economy in actual repairs, and a further economy in that the work could be supervised by one foreman instead of the six required to operate the smaller repair shops under the district system. This centralization naturally brought about a considerable saving in clerical routine also.

By locating the central storeroom in the same building with the Western Electric Company's warehouse, it was possible to cut down the average time of delivery from warehouse to distributing storeroom from one week to a few hours.

The routine covering the handling of deliveries is as follows:

All contract, plant and memorandum orders, on which apparatus must be delivered, are prepared at the close of each day by the night order force from subscribers' contracts, inspectors' recommendations, and written requests from subscribers for change in apparatus, received up to 5 p. m. on the same day. Copies of all such orders are delivered at the central storeroom prior to 5 a. m. the next day. These orders are then assorted by address into delivery districts and turned over to selectors. Cardboard containers are provided, designed to take complete standard station equipments of various types, including directories. These containers are stamped with the type of equipment which they contain, and the selector attaches thereto an envelope containing a copy of the contract order, noting on the outside of the envelope the delivery address.

Packages to be delivered by each wagon are then placed on hand trucks in the order in which they will be loaded on the wagons; that is, routed by deliveries. The wagons report at 7:30 a. m., are loaded with equipment, the drivers are given copies of their respective route sheets, and by 8 a. m. have started to make deliveries.

Apparatus disconnected at subscribers' premises is removed by the workman to the nearest central office, from which place collections are regularly made by the power wagons and the material returned to the central storeroom. Our average cost per delivery, including all charges, is $0.114; our average cost per recovery, $0.021. The average cost of delivery by horse-drawn vehicle, which was tried out before we decided to purchase power wagons, was $0.176. The use of power wagons in connection with

Hoisting poles by machine—the new way. Two men and a driver, without appreciable effort, erect poles at the rate of 12 to 20 an hour, at a cost reduction, compared with the old way, of 60 per cent or more.

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this central storeroom has reduced our annual expense from $79,624 to $64,037—a net saving of $15,587 per year.

* * *

Repair Shop Delivery Service.

The shop service presents a straight delivery problem, comparable with any outside trucking business, and for that reason will not be gone into in detail.

Statement "E" shows the expense of operating the 4,000 to 6,000-pound truck used by the shop for the year 1911, from the time it was put in service, up to and including December. A similar record is maintained for all of the 53 power wagons, 14 touring cars and 97 runabouts owned by the company. Data are taken from daily reports sent in by the drivers, and at the end of each month the supervising forces are provided with these statements which show the expense of the current month, and all the previous months in the year.

It seems probable that the telephone man, not directly interested in outside plant work, does not realize the magnitude of the trucking problem involved in building and maintaining telephone plant. A perusal of this article might, therefore, lead most of us to believe that the company had entered more extensively into the use of power trucks than a proper degree of caution would seem to warrant. As a matter of fact, we are hiring, on the average, approximately five times as many horse-drawn trucks as we have power trucks in service. Our total expense for hired trucks during the year 1911 amounted to $385,559. It is estimated that 50 per cent of this expense was due largely to the very extensive outside plant development work carried on during the year 1911.

We now hire approximately 100 horse-drawn trucks per day. A large part of these are used in loop work, and it is safe to assume that we will continue to hire trucks for this service for a number of years to come, or until such time as a power truck is developed which can be purchased at a price bringing the annual charges as low as or lower than the annual charges on the horse-drawn truck. This holds true because the nature of the work keeps the truck in the field, but idle, for a large part of the working day. Hence the problem is not one of economy in transportation so much as economy in standing idle.

In the traffic congested sections of a city like New York, our experience has been that we could not afford to use power trucks of other than the inexpensive light delivery type. The horse-drawn truck is so much in evidence that the power truck is limited to about the same speed with an investment approximately three times as great. Here the horse-drawn truck must be eliminated before the power truck can come into its own.

GETTING RID OF HORSES.

The first step by the Adams Express Company in Philadelphia, to supplant its horses and wagons with motor trucks was taken on May 7 last, when a permit to convert the company's stable on Twenty-second street, below Market, into a garage, was issued by the Bureau of Building Inspection. The work, which will cost $27,000, will be done by Armstrong & Latta. It is expected that as soon as the alterations are completed the motor trucks now stationed in the company's stables in various parts of the city will be taken to the new garage.

For more than two years the Adams Express Company has been experimenting with motor trucks with a view to testing their adaptability for delivering and collecting packages. The experiment has proved successful and already the company has installed a large number of trucks for delivery work. Although the work of doing away with the horses will require some time, it is expected that by the first of the year very few horses will be used by the company.

ONLY ONE SHOW FOR NEW YORK.

New York will have but one automobile show next winter, and it will be so big as to make necessary the use of two buildings. This was settled definitely during the past month, when a contract was signed for the use of Madison Square Garden by the Automobile Board of Trade, which also has a lease on the new Grand Central Palace.

The combined shows will be held under the auspices of the Automobile Board of Trade, the exhibits being divided between the new Grand Central Palace and Madison Square Garden.

According to present plans, the shows will be open to all makers of motor cars and accessories, but the plan of alloting space has not been definitely settled. It is not unlikely that a single ticket will admit to both buildings with arrangements for conveniently transporting visitors from one building to the other.

It was believed that Madison Square Garden would remain up for a year, but the announcement of the Board of Trade makes this a certainty. The Grand Central Palace people state that plans for their arena, which is to be built alongside the present palace, are being perfected and that it will be ready for the 1914 automobile show.

The show committee of the Automobile Board of Trade that will have in charge the big double exhibition next winter, consists of Colonel George Pope (chairman), Charles Clifton, Alfred Reeves and Merle L. Downs.

E. V. A. FORMS CHICAGO SECTION.

A Chicago section of the Electric Vehicle Association of America, for the promotion of the use of electric pleasure and commercial vehicles, was organized at a dinner attended by more than 100 manufacturers, agents and garage men at the Hotel Sherman, Tuesday evening, May 7, last. W. H. Blood, Jr., president of the national association, and others addressed the diners and emphasized the public benefit that would result from the elimination of the horse from the streets and the substitution of the sanitary, noiseless electric car.

George Harvey Jones of the Commonwealth Edison Company was elected chairman of the Chicago section, G. H. Atkin of the Electric Storage Battery Company vice-chairman, and W. J. McDowell of the General Vehicle Company, secretary and treasurer. Louis Burr, president of the Woods Motor Vehicle Company, and Charles Murphy were named to act with the officers on an executive committee.

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Some Appreciations.

The Power Wagon "Is the Live Wire in Motor Truck Publication."

THE POLICY of this journal has always been to aid and intelligently promote the motor road transportation business and to act as a clearing house of information to makers, dealers and users of power wagons. When a machine or an enterprise had any good points, it has been commended accordingly; when it had no redeeming features, it has been condemned. Unjust discrimination has never been allowed to creep into these editorial pages. Gasoline, electric, steam, gasoline-electric, hydraulic and other types of motor wagon have been, and always will be, reviewed solely upon their merits. Fortunately, the factors of the two predominating types of power wagons—gasoline and electric—are now convinced that there is a place for both to develop side by side, each in the line of work for which it is peculiarly adapted. When these different types are both applicable to a particular service, only the most friendly kind of rivalry exists. And this is as it should be, for the "battle of types" is bad business, at least until the horse is completely dethroned from his present leading position in the road transportation business.

It is a difficult matter for a power wagon publication to escape criticism from the exponents of one type of motor wagon as being more partial to another type of machine. It is particularly pleasing, therefore, to be able to record appreciations from well known exponents of both of the leading types of motor wagon, especially when the manufacturers concerned are two of the oldest, best and most successful in the business.

* * *

What a Leading Gasoline Concern Thinks About the P. W.

The International Motor Company of New York City handles the Saurer, Mack and Hewitt power wagons. There is no one who will not admit that if the motor wagon industry had a Lloyds' system of rating, the International Motor Company would unhesitatingly be put in the A No. 1 class. Under date of February 26, 1912, R. W. Hutchinson, Jr., advertising and publicity manager of the International Motor Company, sent us the following letter:

To the Editor of THE POWER WAGON:

In the press of unusual work at this season of the year, I did not have an opportunity before yesterday to examine your special show issues. I was indeed surprised and gratified to note the interesting character of the contents of these two special issues and particularly pleased to observe the immense amount of care which you bestowed on the co-ordination of the specifications of American builders of commercial motor vehicles. These two show issues are not only valuable to anyone interested in either the selling or the use of commercial motor vehicles, but they form a contribution to commercial motor vehicle literature which, in the writer's judgment, makes them almost classical.

* * *

A Tribute From a Big Electric Wagon Company.

Anyone who knows anything about electric wagons has heard of the General Vehicle Company, of Long Island City, N. Y., which has 12 years of success behind it and many millions of dollars' worth of machines in daily service. Under date of May 7 and 13, 1912, F. Nelson Carle, advertising manager of the General Vehicle Company, sent us two letters, from which the following extracts are taken:

To the Editor of THE POWER WAGON:

I have just run through the May issue of THE POWER WAGON and you are open to congratulations. I do not think any of us ever worry very much about the editorial features because *we take it for granted there will be something worth reading in* THE POWER WAGON and we are mighty glad to see you get the advertising you are carrying.

I believe that THE POWER WAGON has given us in the article "Professional Haulage," one of the most far-seeing visions of the motor truck industry of any publication in the country. It is a matter of some surprise to us to observe how quickly your paper grasps the trend of the times. Many of your past prophesies have been wonderfully accurate. While almost any manufacturer cannot fail to note the changes in the channels of distribution for his product, it takes an organization like yours to follow all the evolutions of the industry and intelligently to present them to the reading public.

The article on "Economic Road Speeds" is also timely and instructive.

* * *

These appreciations are nothing unusual, but coming so close together, and from such representative companies in both of the leading branches of the industry, they have tempted us to take the opportunity of showing our readers what the leading concerns think of The Power Wagon. Here are extracts from some other letters received during the past few months:

"Your paper is one of the best we have found and we are doing all we can to recommend it to our customers."—Central Garage Co., Winnipeg, Can.

"You have the best ever for solid facts and good reading."—Buick Motor Co., Boston, Mass.

"I am interested in power wagons and transportation, being with the Electric Transportation Co., of this city. I find your magazine the best on the subject."—Louis P. Zimmerman, Seattle, Wash.

"Your publication contains just the right kind of information for anybody who is interested in commercial motor vehicles."—C. J. Zinthee, Mgr., Elec. Trans. Co., Seattle.

"I consider your publication of as much importance as any tool might be to the purchaser of a motor truck."—Charles E. Stone, New York City.

"I have almost worn out my old numbers of THE POWER WAGON by loaning them to different people."—Brick P. Kuhn, Omaha, Nebraska.

"I am enclosing a check for $2 to cover my subscription. See to it that I do not miss a copy. I want them all."—M. Hoppenyau, Ashland, Wis.

"Your paper is the live wire in motor truck publication. I consider it the best investment I have ever made."—A. H. Harrington, Dorchester, Mass.

"Your interesting and edifying publication presents to us the long-desired avenue through which we can hope to gain the necessary information touching the availability and practicability of uniting this city with tide-water in San Pedro Bay, our harbor, a distance of 18 to 20 miles.

"Our county will expend $3,500,000 to build a permanent system of highways throughout the county."—A. P. Fleming, Secretary, The Harbor Commission, Los Angeles, Calif.

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Garford

This Garford five-ton truck has twice the capacity and twice the speed of the four-horse wagon beside it, yet it occupies less than half the room

THE ADVANTAGE of the motor truck over the horse-drawn wagon in economy of time, space and operating expense is made apparent by a most casual investigation. A more careful scrutiny will show that one motor truck has points of excellence not possessed by another and the builders of the Garford invite such comparison. The position of the power plant, almost directly under the driver's seat, in Garford three and five-ton trucks gives it an advantage found in no other heavy vehicle, whether horse-drawn or motor-driven. It allows for less over-all length, and consequently less loading and storage space, and facilitates ease of operation in congested streets. Another result of this compactness is that the Garford heavy duty trucks weigh less than any other trucks of similar capacity on the market, which means lower cost of maintenance, less tire expense, less fuel and less oil. For catalogs, testimonials and estimates, write

The Willys-Garford Sales Co.
Toledo, Ohio

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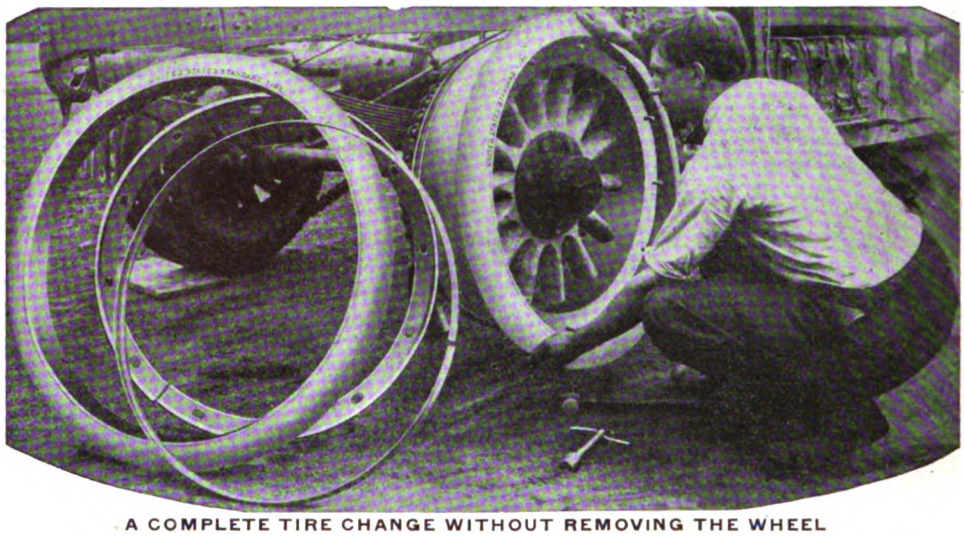
MORE PROFITS from your motor delivery system

is simply a question of getting more service and better service from your motor trucks—of eliminating such needless delays and losses as those occasioned by tire troubles.



A COMPLETE TIRE CHANGE WITHOUT REMOVING THE WHEEL

Business men and motor truck experts everywhere are rapidly coming to realize the tremendous advantages to be gained by equipping their trucks with

THE NEW UNITED STATES STANDARD MOTOR TRUCK TIRE (Demountable)

and thereby positively insuring them against the necessity of ever losing a single hour's service on account of tire troubles and tire replacements.

They are learning that this long-lived tire, with its 10,000 mile guarantee, has not only made tire replacements few and far between, but has made them a matter of a few moments' work on the part of the driver instead of a few days' layup for the truck.

The simplicity and convenience of the demountable equipment makes this tire an absolutely dependable part of your motor truck, enabling your driver to make a tire change anywhere in fifteen minutes' time; a change that would heretofore have required the laying up of your truck from two days to two weeks.

With the services of each truck you operate, worth from $15 to $25 per day, the *money-saving* possibilities of the new UNITED STATES TIRE are obvious.

If you have not yet seen our illustrated booklet, "A Revolution in Tires for American Motor Trucks," you ought to write for a copy today.

United States Tire Company

NEW YORK

BRANCHES, AGENCIES OR DEALERS EVERYWHERE

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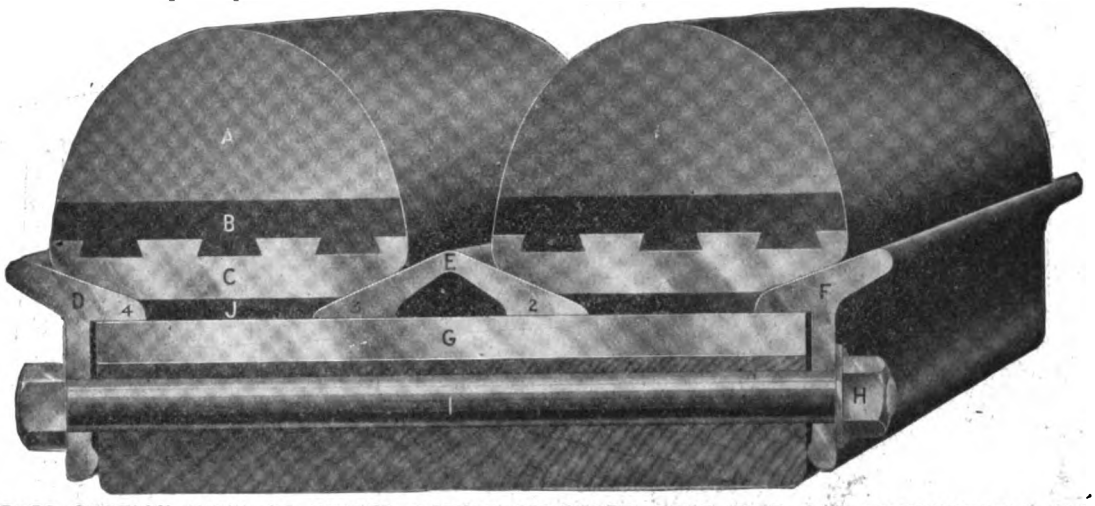
TRUCK MAKERS AND DEALERS

The tires on your trucks will help or hinder their sale

There is no denying the influence that tires have on the sale of motor trucks. Whether you are figuring on the sale of a "fleet" or a single machine, you are bound to encounter the questions of tire mileage and tire up-keep cost.



CROSS SECTION VIEW OF UNITED STATES STANDARD TWIN TIRE AND DEMOUNTABLE RIM

A—Tough Rubber Tread
B—Hard Rubber Base
C—Metal Base
D—Inside Flange Wedge Ring
E—Center Wedge Ring
F—Outside Flange Wedge Ring

The man of big business who uses dozens of trucks demands the *lowest tire cost per mile*, and installs an accurate system of tire cost accounting to see that he gets what he wants.

Tire cost to the man trying out his first installation is second only to his demand for continuous truck service. To tie up his delivery system for days at a time when a tire needs repairs or replacing, may cause him to decide against the use of motor trucks for his delivery work.

Both these tire problems are solved by

THE NEW UNITED STATES STANDARD MOTOR TRUCK TIRE (Demountable)

This tire has an absolute guarantee for 10,000 miles—a lower guaranteed tire cost per mile than any other tire maker offers today

Equally important is the fact that this tire can be changed anywhere by the driver himself in fifteen minutes' time.

Can you imagine a more powerful argument in favor of your make of truck than to be able to absolutely assure your buyer that he will be guaranteed the lowest possible tire cost on his truck equipment (whether it be a single machine or a "fleet"), and that it will never be out of commission a single hour on account of tire replacements?

United States Tire Company

NEW YORK

BRANCHES, AGENCIES OR DEALERS EVERYWHERE

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COMPLETE INSTALLATIONS — GASOLINE GMC ELECTRIC — TRUCKS — COMPLETE SERVICE

You don't have to experiment when you buy a truck

Model K, 5 tons.
Price, Chassis only, $4400.
Owned by
P. M. Leavitt & Co., Boston.

To-day you can purchase a truck that represents the maximum mechanical efficiency and fits, just as nearly as possible, *your* particular business requirements. It isn't necessary to buy an unknown quantity. It isn't necessary to be restricted to one type or style. You can buy *just what you should have*—a truck that will prove efficient from the beginning.

In buying your first truck you want unbiased recommendation. You want it from a company making a wide range of capacities and in electric and gasoline types.

General Motors Truck Company is such a concern—the only comprehensive manufacturers in the world making both gasoline and electric trucks. Gasoline equipment from 1¼ tons to 5 tons and Electric from 1000 lbs. to 6 tons.

This is why we can recommend a truck particularly suited to your business. We have it. If you wish, we will analyze your delivery problem thoroughly, and suggest, if you desire, suitable equipment.

Write for gasoline or electric catalogs or both.

Correspondence from prospective purchasers and dealers is invited.

GENERAL MOTORS TRUCK COMPANY

DETROIT, MICHIGAN

Branches: New York, Chicago, Boston, Philadelphia, Kansas City, Detroit

Please mention the "Power Wagon" when writing to advertisers.

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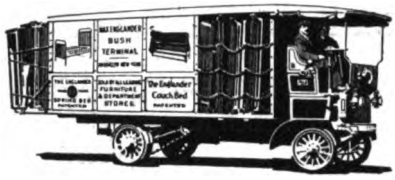

This truck has been in continuous service over 2 years without any cost for repairs

Burns Bros have 20 of our 3- to 10-ton trucks in service

The Scully Steel and Iron Co. of Chicago is using one of our heavy duty trucks with great success in transporting structural material

Mack Proved by 12 years of real service Saurer Proved by 17 years of real service Hewitt Proved by 10 years of real service

"Leading gasoline trucks of the world"

Every business man with a transportation problem wants to know:

1. Can I save money by replacing horse-drawn vehicles with motor trucks?

   The International Motor Company offers you full data and information on this subject as applied to every line of business.

2. What is the most reliable truck?

   The International Motor Company's trucks have absolute proof of long life and reliable service — Mack, 12 years of proof; Saurer, 17 years of proof; Hewitt, 10 years of proof. Long life means slow wear and slow wear means reliability.

3. What ton-capacity and style of body can I use most profitably?

   The International Motor Company's trucks are built in all load capacities — 1, 1½, 2, 3, 4, 4½, 5, 6½, 7½ and 10 tons — with every style of body built in their own plant. They are therefore in a position to give you free and unbiased advice as to what size or sizes and styles are suitable to your requirements. This is not true of manufacturers who make only one or two sizes.

The full facilities of our Engineering Department are at the disposal of any business concern interested in good truck service.

To Dealers:

We offer our representatives the best business opportunities in the motor-vehicle field. Write for our dealer's proposition.

International Motor Company

General Offices
57th and Broadway New York

Works
Allentown Pa; Plainfield N J

Sales and Service Stations

New York, Chicago, Philadelphia, Boston, Cleveland, Buffalo, Baltimore, Newark, St Louis Atlanta, Kansas City, Denver, San Francisco, Los Angeles, and other large cities

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Design Features.

Springs, Wheel Diameters, Tires, Warning Signals, and Mechanical Starters.

OWING to the recent activity of the S. A. E. and the N. A. A. M. in power wagon matters, several things in connection with motor truck design and equipment have lately been brought into prominence. Among these we will consider briefly the question of spring design, wheel diameters, tire equipment, warning signals and mechanical starters.

* * *

Spring Design.

Efficient spring suspension has been a difficult problem from the very inception of the motor wagon industry, and is still far from a satisfactory solution. An exception may possibly be made in the case of light delivery wagons, especially those provided with pneumatic tires, for with these the load range is comparatively small.

There are many conflicting views on this problem of spring suspension. One expert is strongly opposed to the use of platform springs, while another will not consider anything else. This latter is a well known Chicagoan who has used motor wagons for the last 9 years, and who has had experience with electric, gasoline-electric and straight gasoline types. He advocates the use of main springs of the platform variety, with supplementary spiral springs to take care of the heavy loads. He reduces the "whipping" of the covered top by using a special light top, with curtains that can be drawn into place in rainy weather. This he designed himself, and it is proving very satisfactory in service.

It would seem as if the free adoption of supplementary springs would prove a satisfactory solution of the problem until such time as a hitherto undiscovered genius will provide a pneumatic or hydraulic suspension of some kind. Radiators, motors and drivers' seats are being provided with auxiliary spring suspensions by an increasingly large number of manufacturers. It is advisable, however, not to introduce undue complexity into the design to remedy any apparent defects of the models now on the market. Many of the present troubles would disappear automatically if the machines were so routed as to carry full load practically the whole distance, and if they were operated on roads that will not put too severe a strain on the spring suspensions.

* * *

Wheel Diameters.

In many of the models now in use, the wheel diameters are much too small. A small wheel naturally requires a correspondingly small tire, but it is bad policy to decrease the initial tire expense by cutting down the wheel diameter. One experienced motor wagon operator, who formerly used 32-inch wheels, now specifies 38 inches as the wheel diameter for any machine he intends to purchase. He avers that the saving in his annual tire bill by using the larger wheels amounts to several times the difference in the first cost of the tires. Moreover, the larger wheel affords a greater road clearance—which counts heavily on snow-covered roads—besides smoothing out inequalities in road surface and therefore diminishing the wear on the machines. On well paved and well kept city streets, the extra large wheel may not prove such a tremendous advantage, but for country hauls its superiority is unquestionable. The specifications for army motor wagons, by the way, call for larger wheels than ordinary.

* * *

Tire Equipment.

The problem of tire equipment is intimately related to that of wheel diameter. The larger the wheel diameter the narrower can the tires be made. There are several reasons for this. One is that the flatter the tire, the greater is the length of the ground contact and the less is the distortion of any particular section of the tire at any time. Another is that the longer the tire circumference, the greater is the time the tire has to cool off before it again becomes distorted by contact with the ground. Thus it is apparent that if the wheel diameter is made as great as possible—consistent, of course, with other design features—the life of the tire is increased accordingly.

There are other important advantages to be gained by using comparatively narrow tires of large diameter. All good roads are made with an arched surface, so as to shed rainwater freely or to permit of flushing. A wheeled vehicle running over a curved road naturally has most of its weight thrown on the inside edges of the tires. If the tires are very broad, especially when they are of the twin or dual variety, the outside of the tire receives very little of the load under ordinary circumstances, and sometimes none at all. The disadvantages of this are obvious. The only apparent remedies are to invent some kind of a differential device to throw the weight automatically on all of the contact surface of the tire equally under all road conditions, or (and this seems the only practical solution) to increase the wheel diameter and cut down the tire width accordingly. A partial solution, which has attained some vogue abroad, is to provide a steel tire outside of the rubber, but the results so far obtained are not yet conclusive as to the practicability of this idea.

* * *

Warning Signals.

The list of manufacturers of signal devices for automobiles is as lengthy as the "tale" of the proverbial cat, but there are very few of these devices that are applicable to the motor wagon. Complaints have frequently been made that most of the warning signals now on the market will not stand up in the rough practice of commercial power wagon service.

Many drivers imagine that the muffler cut-out is the most efficient agent for apprising pedestrians of the approach of their machines, but the cut-out is now under the ban of the law in many places, and properly so. Others have told how they have tried out some of the "new-fangled" devices but that most of these signals soon got out of order and were superseded by the notoriously inefficient bulb horn, the only merit of which is that it technically complies with the law.

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Some favorable opinions have been received regarding the use of certain electric signal horns. Whatever may be the final solution of the problem, it is certain that it is well worth the attention of somebody with both brains and capital, for the power wagon market before very many years have passed will be calling for the production of five million dollars' worth of signal horns every year.

* * *

Mechanical Starters.

It is only a question of time before every gasoline machine will be equipped with a "self-starter." There are numerous devices now on the market from which to choose. Only a few models are now equipped with starting devices; others will join the procession in 1913; and it is quite possible that 1914 will be a "self-starter" year in the power wagon industry.

For machines that are used on high-pressure service with many stops and starts, as in house-to-house delivery or in public passenger conveyance, the mechanical starter seems to be almost a necessity. Even in services where its economy, either in gasoline and oil consumption, wear and tear on moving parts, and saving in time of men and machines, is not so marked, the employment of the "self-starter" will prove an economy on account of its moral effect in speeding up the service. Anything that substitutes machine precision for manual or animal labor is of economic value and will therefore be welcomed in power wagon transportation.

CO-OPERATIVE DELIVERY FOR ELGIN.

Merchants of Elgin, Ill., are negotiating for a co-operative delivery system. As the plan is worked in other cities, a stock company is formed which buys all the motor wagons, horses, wagons, and equipment, a manager is appointed and he in turn hires the drivers and looks after the affairs of the company.

The delivery covers the city thoroughly, each wagon having a certain route to cover two or three times a day. Solicitors for the various stores cover the city each morning, telephoning in their orders in time for the first delivery. Housewives may also order by 'phone and have the driver collect the bill for the goods.

As the system works out, the housewife has meats, groceries, oils, all delivered to her home at one time instead of being bothered by several drivers from the different places.

MASSACHUSETTS MAY RAISE FEES.

A bill pending in the Massachusetts legislature, and favorably reported upon by the Committee on Roads and Bridges, provides for the following registration fees for motor vehicles: 5 to 19 hp., $4.80; 20 to 29 hp., $11.60; 30 to 39 hp., $19.50; 40 to 49 hp., $36.75; and over 50 hp., $50.

Motor wagon men are opposing the passage of the bill.

"For example," says Lewis R. Speare, of the Massachusetts State Automobile Association, "some five-ton trucks have 35 horsepower, some have 40 and some 48.6. Each is carrying the same load and at the same rate of speed. Manufacturers agree that 12 miles an hour is the speed that a truck should make, and it should not be driven at a higher rate. If the 48.6 horse-power truck was rated at 49 the fee would be $36.75, the 40 horsepower would pay $30, and the 35 horsepower would pay only $17.50, less than half the registration of the 48.6 truck, while doing equal damage to the road in every respect.

"We have suggested the following scale for motor trucks, which would make an enormous increase in the amount of registration, and, it seems to us, would be fair: 1-ton, $5; 2-ton, $7.50; 3-ton, $10; 4-ton, $12.50; 5-ton, $15; 6-ton, $17.50; 7-ton, $20; 8-ton, $22.50; 9-ton, $25; 10-ton, $27.50; over 10-ton, $50."

FIRST MOTOR STAR MAIL ROUTE.

The first motor star mail route to be established in the United States will run out of Pueblo, Colo., if the request of Postmaster N. S. Walpole is complied with by the postal department. Postmaster Walpole has asked for the establishment of a motor star mail route between Pueblo and Rye, taking in Fisher, Abbey and Crow and finishing at Rye.

The route as planned will take the mail out of Pueblo through the stations named to Rye on one day and return the next. The distance to Rye is about 38 miles and the trip through the other villages named would make the route slightly longer.

Heretofore the mail to Rye has been sent through Graneros. The double track to Walsenburg will cause the establishment of a new station six miles south of Graneros at which the through mail trains will stop, while only the local will stop at Graneros. This will do away with Graneros as a mail transfer point and makes the most feasible method of sending the mail to Crow, Fisher, Abbey and Rye by the auto line which will make the trip every day through the summer.

It is believed that if the government will establish a motor mail route the motor line will be operated all the year around. Data and a map of the roads to be used on the route have been forwarded to the postal department at Washington and there is a chance that the route will be established.

The route will be of considerable benefit to Pueblo merchants as it will put them in touch with the territory covered.

London will have a mammoth motor wagon parade on June 10 next.

Seven motor wagons were engaged to carry the runners' clothes in connection with the Marathon race promoted by the New York "Mail-Express."

A motor wagon line is doing a profitable business between Woodstown and Philadelphia in gathering milk for the market from farmers and delivering empties.

The mayor of Independence, Mo., has ordered the police to arrest drivers of county motor wagons who drive too rapidly and those who damage the roadway by the unnecessary use of heavy chains.

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Horses and Flies.

Breeding Flies and Then Killing Them Will Not Solve the Fly Evil.

"STEAL a march on the fly. Swat him (or her, especially her) early, and save the necessity of swatting a hundred billions, or quintillions—estimates vary on this point—when the heat of the summer is upon us."

This and similar warnings abound in the daily newspapers and in the magazines at this time of the year. But such instructions, while admirable enough in their way, strike only at the effect and not at the cause of the fly evil.

If every man, woman and child in the whole world were to devote six hours a day from now until the crack of doom to the sportive pastime of squashing the daylights out of every fly in sight, the pestiferous little aviator would not be much further from extermination than he (or she) is at the present time.

Consider a parallel from the East. The nomadic Arabs don't like fleas any better than the most highly civilized communities of the West. Yet fleas are practically unknown in a well regulated household in such a country as ours, while in an Arab encampment they are apparently as numerous as the sands of the desert and as much in evidence as bedbugs in a Siberian hotel.

What is the answer? Western civilization demands personal and bodily cleanliness, while in the East a smear of oil is considered a sufficient substitute for the enameled bath, hot and cold water, cake of soap, and all the "trimmings" that go with our morning "tub." The careless Arab, therefore, simply invites the flea to reside in his wearing apparel, while the very cleanliness of the American or European serves as an efficient protection from the inroads of *Pulex irritans*.

So with the fly nuisance. The presence of decaying animal or vegetable matter or animal excretions provides not only a feeding ground for the fly but also a prolific breeding place. One pound of horse manure will raise 2,500 perfectly good flies, while the millions of tons of stable refuse that are produced yearly in this country will breed these insects in such numbers as to beggar computation.

The trouble is that horses are associated with the habitations of man. Chicago alone has nearly 100,000 horses, stabled and living among and around our dwelling places. The excretions from these animals are in evidence everywhere, and, together with the accompanying stable refuse, are sufficient to breed over ten billion flies every day. Therefore, in order to exterminate the fly in Chicago, every man, woman and child in this city would have to kill about 5,000 flies a day to check the daily augmentation to the fly population that this filthy matter is capable of breeding. And this does not take into account the refuse that is produced in the kitchens of our houses, or in the stockyards, or the provision stores, etc.

Obviously a campaign of extermination by the application of the "fly swatter" or the use of fly papers and traps is impossible. We must strike at the root of the evil by removing the cause. Let us be more sanitary in our environments. Very obviously one of the most important things to be accomplished is the total banishment of the horse from our thickly settled communities. And it is fortunate that the advent of the motor wagon and the automobile will enable this to be done with greatly increased economies in other directions as well.

TEST CASE ON MOTOR TAXES.

An interesting case which will hold the attention of automobilists, not only in Cincinnati, but all over the state, will soon come up in court at Bellevue, Ky. The whole story hinges on the taxing of motor trucks in one city after a tax has been collected on them in another. Recently the Bellevue authorities decided to make the owner of each truck using the streets pay $4 per ton. The Cincinnati Automobile Club forever looking out for the benefit of its members, immediately became interested, and from what was learned, was of an opinion decidedly in contrast to what the Bellevue Council set forth.

Deciding to test the validity of the law, the Auto Club secured a 4-ton truck from a local plumbing company and sent it over to Bellevue with the instructions to the driver to ride over the streets until some one tried to stop him. The Bellevue authorities were evidently aware of what the Cincinnati Auto Club had decided to do, and probably fearing that they were not strong enough to enforce what they had made a law, did not arrest the driver until a few days after. In Cincinnati the tax of the 4-ton truck is $5. Bellevue wants $14 a year.

The Auto Club has secured the best of legal talent and has decided to fight the case to a finish. Legal rulings have been delved into the past few weeks, and from what is learned Bellevue's law, taxing such an enormous amount on trucks, is unconstitutional. The secretary of the state has given his views on the matter to the Auto Club and that alone is strong enough to make one believe that the club is right in its contention.

STUDEBAKER SHOWS MOVING PICTURES.

The Studebaker company has had 10,000 feet of moving picture films made, at an expense of $25,000. These pictures are being shown all over the country. They take one through the immense E.-M.-F. and Flanders factories in Detroit, Mich., thus illustrating the details of automobile manufacture in 1½ hours what it would take a visitor to the plants a week to see personally.

Joliet, Ill., has passed an ordinance for licensing motor wagons, at fees ranging from $1.00 to $6.00 a year, according to class.

Sandusky, Ohio, has installed a motor wagon for mail service. The local postmaster says it will save the government $300 a year.

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The Speed Question.

Letter from the N. A. A. M. Shows That Further Discussion Is Necessary.

FOLLOWING the publication of the articles "Motor Wagon Speeds" and "Economic Road Speeds," which appeared in the order named in the two previous issues of the "Power Wagon," this journal requested an expression of opinion on the speed question from the National Association of Automobile Manufacturers, and this was furnished in a letter from H. W. Perry, secretary of the Commercial Vehicle Committee of the N. A. A. M.

As will appear from Mr. Perry's explanation, which is given in full below, the N. A. A. M. speeds were intended to form the foundation of the standard warranty which is being considered by the association. This, however, did not appear, even by implication, in the official publicity matter sent out by the association concerning its epoch-making convention of March 4 and 5 last, and its Executive Committee meeting (at which the speeds were officially recognized) of March 6. Hence there is no apology needed for the attitude taken by the "Power Wagon" in discussing the speed question, and even if all the facts in the case had been known, there are still plenty of reasons for reopening the subject.

For instance, is it to be presumed that a motor fire engine, weighing 6 tons or more, must not be operated at a speed greater than 11 miles an hour? (This is the N. A. A. M. speed for a 3 ton motor wagon which, with its load, will weigh 6 tons.) And if a solid-tired 1-ton motor wagon may be run at 15 miles an hour, must the same maximum speed apply to a similar machine equipped with pneumatic tires? Must a power wagon for hauling coal or lumber be operated as fast as a motor truck of the same rating used for delivering newspapers, or a motor bus running on the boulevards, or a police patrol wagon, or a motor ambulance? If a concern like the Adams Express Company is in the market for 100 motor wagons, will the members of the N. A. A. M. pass up the order because Superintendent Clark of the Motor Vehicle Department of that company wants higher speeds for his service than are stipulated by the N. A. A. M. standard warranty? Yet these are facts which must be faced. They were clearly brought out in the articles mentioned.

If substantial and experienced motor wagon buyers want higher speeds than those recommended by the N. A. A. M., they will get them. Any attempt to force business men to accept what they do not want will only have the effect of throttling the market. Surely the Adams Express Company has been operating motor wagons long enough and in sufficient quantity to know what is necessary for its transportation service. The issue now is fairly up to the N. A. A. M. Mere recommendations by manufacturers will not suffice. The experienced users must be consulted, and especially those who have already bought machines by the hundred and who are likely to buy a few hundreds more. And, by the way, motor wagon practice is an exact science, and should not be governed by the law of averages.

Mr. Perry's letter follows; the italics are ours:

NATIONAL ASSOCIATION OF AUTOMOBILE MANUFACTURERS,
New York, May 20, 1912.

To the Editor of The Power Wagon:

The articles entitled "Motor Wagon Speeds" and "Economic Road Speeds," published in the April and May issues of The Power Wagon respectively, to which you have called attention with a request for an expression regarding them, have been read with interest.

There appears to be some misconception of the purpose of the speed ratings recommended by the N. A. A. M. The rated load and speed are designed to form the foundation for the standard warranty which will probably be adopted at the June meeting. In the interest of the industry as a whole, it is particularly desirable at this time to seek to bring about uniformity in construction of the vehicles and in the business of selling them. Such uniformity is in the direction of conservatism and tends toward stability of the industry, which is of greater importance to everybody concerned than a temporary obtaining of the utmost economy of operation of the vehicles in individual cases.

The speed ratings recommended by the N. A. A. M. were not formulated at the commercial vehicle convention of March 4 and 5, but represent the average of actual speeds at which numerous manufacturers who responded to letters of inquiry rate their trucks. *The table, therefore, represents the average of prevailing practice and not simply the opinion of the representatives in attendance at that meeting.*

In this connection it is most desirable that there should be no misconception of the work that the National Association is attempting to do through its Commercial Vehicle Committee. Before any recommendations for standardization are formulated an effort is made to obtain data of actual practice from all manufacturers of motor trucks and delivery wagons, irrespective of membership in the organization or attendance at the conventions, to which all are invited.

As you and all experienced manufacturers of commercial and industrial motor vehicles know, the two abuses from which the machines and tires suffer most are overloading and overspeeding. Yet the manufacturer is frequently blamed for breakages that occur as a result of such abuses and demands are made upon him for repairs and replacements. The object of the March convention was to adopt a load and speed rating on which all manufacturers could give a guarantee that could be lived up to. It must be taken into consideration that the guarantee covers the use of the truck, with full rated load, at the rated speed over all sorts of roads during the life of the warranty. The manufacturer is interested primarily in the integrity of the machine, and he should be credited with a knowledge of what are safe and reasonable conditions of its use. Examples of its misuse by overloading, overspeeding, excessive hours of daily use, and lack of proper attention to oiling, cleaning, and adjusting, are too common to justify the expectation that users should be allowed to set the standards of service and still hold the manufacturer responsible for breakages and wear under the warranty voluntarily given by him.

It may be safely left to the user to load and operate the truck at least to the economical maximum of its capacity after expiration of the warranty, when he is at liberty to exercise his sole judgment in the matter without involving the maker in the responsibility. If conditions of service are such in his locality and business that higher speed than the standard rating would prove more economical, he can operate at the increased speed and pay for excessive wear and damage done.

All responsible manufacturers are perfectly willing to stand back of their trucks if operated in a reasonable way, but ex-

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perience has shown that it is necessary to guard against abuse and unreasonable demands. *As a matter of fact most trucks, if not all, are built with an overload capacity, usually of* 20 *or* 25 *per cent, and most of them can be operated at more than the rated speeds recommended, but the manufacturer does not feel called upon to advertise these maximums and guarantee the truck against breakage for three months if operated to the full capacity and speed over all kinds of roads perhaps* 20 *to* 24 *hours daily.*

Obviously it would be impossible to adopt any standard speed rating for all types and sizes of trucks that would prove most economical for all users alike. Vehicle and tire wear may be minor factors in some lines of business, but these are the exceptional cases; the great majority of users are much concerned over the cost of maintenance and upkeep, which are most directly affected by the abuses of overloading and overspeeding. In the adoption of any standard, the interest of the majority must prevail.

Some experienced users undoubtedly know what are safe and economical speeds for the trucks in their service, but the majority of purchasers, many of whom never have owned or used trucks, require to be protected against their own lack of knowledge and the ignorance or irresponsibility of their hired drivers; hence the resort of the manufacturers to the housed in and sealed governor on the engine to prevent excessive speed. A device to prevent overloading, if practicable, doubtless would be welcomed by the makers and incorporated in the machine as a further protection of the purchaser's interest as well as their own interest under the warranty.

The tire question is directly involved also in the consideration of load and speed ratings. Tire manufacturers may be conceded to know better what shocks the rubber will sustain without injury than either the truck manufacturer or the truck user. They have established tables of definite tire sizes for given loads based on the ordinary speeds at which trucks are used normally. They guarantee their tires for a specific mileage (some makers for 8,000 and others for 10,000 miles) during the first year of service under such normal use. While certain users might find it economical to run their trucks at higher than the rated normal speeds recommended, or to load them beyond the standard load rating, it would be unreasonable for them to expect the tire manufacturer to make replacements or mileage allowances under the guarantee for excessive deterioration of the tires resulting directly from such usage. Nor should the minority who wish to run their trucks and tires into the scrap heap in the first year or two impose the penalty on the majority who are satisfied with the more normal use of the vehicles, as would be the result if speed ratings were increased and tire makers should insist upon the fitting of larger sizes of tires on trucks of given capacity. Perusal of the letters from manufacturers as printed in your issue for May shows that the consensus of opinion seems to be that the only practical solution is the adoption of standard speed ratings and that those recommended by the N. A. A. M. meet with general favor.

Very truly yours,

H. W. PERRY,
Secretary, Commercial Vehicle Committee.

In London, Eng., one taxicab driver informs another when the door of his cab is open, by a single long-drawn whistle.

Pittsburgh has bought three 6½-ton power wagons, at a cost of $5,675 each, to be used in hauling asphalt for street repair.

A taxicab driver in Paris increases the earning capacity of his machine by using his wife as a relief driver. Between them they work 20 hours a day and are making a lot of money.

CHANCE FOR THE N. A. A. M.

The N. A. A. M., in addition to the many other useful functions it is now performing, would be well advised to take up the matter of motor wagon contests and demonstrations, and disentangle a situation which is getting intolerable.

On several occasions in the past, the "Power Wagon" has called attention to the unsatisfactory "Rules for Commercial Vehicle Demonstrations" issued by the American Automobile Association. The 1912 rules just put out by the Contest Board of the A. A. A. are no better, except in some minor and unimportant particulars, than those of previous years. Obviously the A. A. A. is incompetent to handle this branch of automobile activity, and it is imperative that the N. A. A. M., which at least is representative of the motor wagon industry—the A. A. A. decidedly is not—should step in and put this matter on a satisfactory basis.

If the members of the N. A. A. M. are in favor of contests, the rules should be made adequate to cover the situation. While the A. A. A. has done much good in its own line of automobile sport promotion, it has proved itself incapable of handling a motor wagon contest, which is not a sporting event but strictly a business matter.

The very definition of a "commercial vehicle," a term in itself too general to apply strictly to the class of road vehicles intended, is wholly inadequate. By its loose and inaccurate phraseology the A. A. A. definition bars out the large and growing class of three-wheeled motor "trade carriers," and excludes, in its strictest application, several excellent electric wagon models which have only one service brake, the motor, of course, also being used for braking purposes in these cases. While on the subject of braking it may be mentioned that a "perfect" brake, according to the A. A. A. rules, stops a motor wagon in 50 feet. This may be good touring car practice, but it would be suicidal if applied to the heavy types of motor wagons.

Altogether, the present system of motor wagon "contests" is impossible. The N. A. A. M. should first find out if its members are in favor of them—many of the leading manufacturers are very much opposed to the idea—and then if it is decided to continue them, the rule making should be done by an N. A. A. M. committee. It is obviously absurd for an outside body, like the A. A. A., to continue to tax this industry for "permission" to hold contests. The whole thing is clearly a revenue-making scheme and has not even the merit of being expertly conducted.

MOTOR WAGON FOR DOG CATCHERS.

Chicago has a motor dog-catchers' wagon. It was placed in service on May 23 last by William F. Stuart, superintendent of the city dog pound, when it did yeoman service in rounding up the stray and unlicensed dogs of Rogers Park.

The Puente Oil Company, operating in the Fullerton oil field in California, uses a big motor wagon which draws three oil tanks as trailers.

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KENNEDY ON COST ANALYSIS.

Speaking before the Motor Truck Club of New York, on May 15 last, William P. Kennedy, head of the Alco transportation cost bureau of the American Locomotive Company, told the importance of scientific comparison of motor truck and horse expenses as a factor in the adoption of trucks. His subject was "Administrative Engineering and Salesmanship in the Motor Wagon Field." Mr. Kennedy made a plea for the type of salesmanship that recognizes the practical needs of the individual case.

"The characteristics of the commercial line are in radical contrast with the pleasure car business," he said, "the inception and purpose of the one being so different from the other as to render obsolete many of the formulated practices heretofore in vogue; conspicuous among which is a too complete reliance upon the individualistic function performed by the salesman.

"A rational investigation will prove that the introduction of any novel business utility of an economic character calls for genius of a high order. If the utility proposes to supersede some established practice with expense reduction, it calls for the faculty of comparative analysis, which is at least uncommon. If the utility, furthermore, is an article of machinery, mechanical talent, if not engineering ability, is a valuable necessity.

"To expect the type of salesman usually employed in the pleasure car field to step into the breach and independently effect the introduction of commercial cars is at least unreasonable; and the continuance of this fallacious practice has led to much disappointment.

"The application of machinery to merchandise delivery purposes calls for an accurate knowledge of the work to be performed, an intimate familiarity with the capabilities of the machine and sound judgment in the method of its application.

"The commercial engineer should be conversant with transportation operation and cost under all circumstances, and should acquire those habits of mind which will enable him to regard mechanical equipment from the standpoint of ownership.

"The principal duty of the engineer will be carefully to analyze the conditions prevailing in those cases where it is desired to introduce machine equipment for transportation. One of the first provisions in making these investigations should be to verify the resulting figures by the responsible representative of the prospective purchaser.

"This will insure that correct information is being used as a foundation for comparison, and that there will be no subsequent contradiction, or distortion of fact, to defeat a presentation of economical substitution. There is a marked advantage in possessing this authenticated information since it insures to the investigator a definite basis for demonstrating economy.

"An analytical study of the work to be done, or how it is at present performed, will often afford a great advantage to the purchaser who is not usually qualified to examine critically his own operating conditions.

"It should be a fundamental purpose of the engineer to provide his co-operating salesmen with serviceable information of a bookkeeping or monetary character entirely devoid of technicalities, with perhaps the exception of performance data.

"In generally seeking for stimulating means to promote business the engineer should be ever on the alert to utilize to advantage those methods which have been effective in other organizations engaged in the introduction of industrial apparatus."

How the salesman may best co-operate with the transportation expert was told by the speaker, who continued:

"In presenting his case to new prospects he should create the impression that he is a solid, intelligent man, with plenty of energy and perseverance, and well versed in the purposes of his mission.

"Perseverance in the direction of convincing the purchaser of the utility and economy of the machine he has to sell, without introducing technical discussions or invidious contrasts with the products of others, is an art very rare and very valuable."

UP-TO-DATE WOMEN IN N. Y.

"It's time for New York to discard its horse drawn toy carts and to adopt modern methods in the collection of ashes and garbage," said an official of the Women's Municipal League of New York City, to the Board of Estimate and Apportionment on May 16 last. The scheme outlined was submitted by Mrs. Julius Henry Cohen, chairman of the League's Committee on streets, and will be considered by a committee made up of President Mitchell, of the Board of Aldermen, and Borough Presidents McAneny and Cromwell.

Standard sealed receptacles, to be owned either by the city or owned privately and marked for identification, are suggested for the collection of both garbage and ashes. The Women's Municipal League suggests that these receptacles when filled shall be conveyed in power wagons to the Street Cleaning Department dumping boards and the contents then dumped into scows.

"These receptacles after being emptied should be thoroughly washed before being returned to their owners, if they are privately owned," the women suggest. If the city provides the cans they are to be interchangeable, and sufficient are to be provided to have at least two for every householder.

It is pointed out that the substitution of big motor wagons for horse drawn vehicles will work an economy by doing away with many drivers, helpers and hostlers and will admit of the removal of a greater amount of ashes and garbage than under present conditions. The use of sealed receptacles, it is also asserted, will lessen the liability of spreading disease and will do away with the present nuisance incidental to emptying the cans in the streets in front of every building.

It is a misdemeanor in Newark, N. J., to use a warning signal recklessly.

Up to date, Boston's Highway Commission has been unable to pass its bill for limiting the weight and speed of motor wagons. The opposition is too strong.

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The Cost of Current.

Current Consumption and Cost for Electric Wagons in Various Cities.

THE AVERAGE business man who is contemplating the purchase of an electric wagon or a fleet of these machines is usually much at sea when he tries to find out what electric current will cost him. A perusal of the usual form of rate card supplied by the central station will only make confusion worse confounded, for even when stripped of all superfluities there are usually left enough technicalities in the rate schedule to prevent the ordinary mortal from discovering even approximately what his expenditure for electric current will be.

The reason for this is that electricity is not one of those commodities that can be sold at so much a pound, or a bushel, or a yard, or any other measure. True, the final statement works out to so many cents per kilowatt-hour—which is analogous to the foot rule for measuring cloth—but the method in arriving at the number of cents involves, among other things, not only the total quantity of current taken but also the maximum amount required at any one time and also the hour of the day at which it is used.

This is only fair to the electric generating company, which must install apparatus sufficient to supply the greatest amount of current that is desired by its customers at the time of maximum demand, so that if one of these customers will agree to take current when most of the others are not using electricity—as in the early morning—the price is and should be lower than if the demand were made when nearly everybody else is taxing the electric supply mains to capacity.

As a matter of fact, the cost for electric current is one of the smaller items entering into the accounting of the electric wagon, but still it is important enough to be clearly defined in particular cases. It is with the hope of removing the difficulty of cost estimating in this phase of the motor truck business that the "Power Wagon" has collected data on the cost for current for operating electric wagons in several of the larger cities. These data are presented in tabular form, and apply to single machines and to fleets of 5, 10, 20, 50 and 100, operating on average pavements for daily travels of 40, 30, 25, 20 and 15 miles, respectively, in each case. The current consumption in kilowatt-hours per month, and the cost per kilowatt-hour, in each of the several cases considered, are clearly shown, so that the veriest novice will have a clear conception of what his bill for electricity should be in a particular case.

The figures given in the table published herewith, apply only to the city of Milwaukee, Wis. Other cities will be considered in later issues. The form of this table is due to S. B. Way, assistant general manager of the Milwaukee Electric Railway & Light Company, who greatly improved on a form which was submitted to him for filling in with the necessary particulars. Mr. Way's explanation of the table is as follows:

"The table submitted by you was not arranged to supply the information you requested accurately. We have, accordingly, rearranged the table and furnish you herewith a table showing the several sizes of trucks mentioned in your table, which are the sizes commonly in use, the current consumption per month for various numbers of these trucks operating various mileages per day, and the rate in cents per kilowatt-hour which this charging load would earn on the power schedule which we have in effect, and which is particularly adapted to automobile charging and service of like character—this being for current can be kept off of the daylight load and the evening

Consumption and Cost of Current in Milwaukee for Motor Wagons in Units or Fleets.

No. Trucks.	Miles Per day.	½ Ton Month Cons. K.W.H.	½ Ton Cents per K.W.H.	One Ton Month Cons. K.W.H.	One Ton Cents per K.W.H.	Two Ton Month Cons. K.W.H.	Two Ton Cents per K.W.H.	3½ Ton Month Cons. K.W.H.	3½ Ton Cents per K.W.H.	Five Ton Month Cons. K.W.H.	Five Ton Cents per K.W.H.
1.....	40	437	3.75	515	3.9	685	3.84	856	3.83	1,028	3.8
1.....	30	330	4.05	388	3.98	520	3.99	650	3.94	780	3.91
1.....	25	286	4.18	338	4.55	443	4.08	560	4.03	675	4.00
1.....	20	245	4.32	286	4.3	377	4.22	482	4.15	572	4.10
1.....	15	218	4.45	258	4.41	354	4.27	430	4.23	520	4.20
5.....	40	2,185	3.3	2,580	3.2	3,430	3.08	4,280	2.94	5,140	2.52
5.....	30	1,550	3.54	1,940	3.55	2,610	3.27	3,250	3.18	3,900	3.09
5.....	25	1,430	3.7	1,690	3.6	2,220	3.53	2,800	3.28	3,380	3.20
5.....	20	1,225	3.89	1,430	3.8	1,890	3.57	2,410	3.40	2,860	3.31
5.....	15	1,090	4.07	1,290	3.94	1,770	3.65	2,150	3.53	2,600	3.41
10.....	40	4,370	2.92	5,150	2.56	6,850	2.49	8,560	2.34	10,280	2.21
10.....	30	3,300	3.18	3,880	3.14	5,200	2.80	6,500	2.60	7,800	2.47
10.....	25	2,680	3.35	3,380	3.24	4,430	3.44	5,600	2.79	6,750	2.60
10.....	20	2,450	3.43	2,860	3.38	3,370	3.36	4,820	2.97	5,720	2.82
10.....	15	2,180	3.54	2,580	3.47	2,540	3.62	4,300	3.18	5,200	2.96
20.....	40	8,740	2.34	10,300	2.23	13,700	1.96	17,120	1.82	20,520	1.71
20.....	30	6,600	2.61	7,760	2.54	10,400	2.29	13,000	2.08	15,600	1.93
20.....	25	5,360	2.85	6,760	2.66	8,860	2.46	11,200	2.26	13,500	2.08
20.....	20	4,900	2.99	5,720	2.86	6,740	2.75	9,640	2.44	11,440	2.28
20.....	15	4,360	3.18	5,160	3.02	6,080	2.96	8,600	2.58	10,400	2.42
50.....	40	21,850	1.70	25,800	1.62	34,300	1.51	42,800	1.44	51,400	1.39
50.....	30	16,500	1.91	19,400	1.83	26,100	1.67	32,500	1.58	39,000	1.52
50.....	25	14,300	2.05	16,900	1.95	22,200	1.79	28,000	1.68	33,800	1.57
50.....	20	12,250	2.24	14,300	2.13	18,900	1.94	24,100	1.79	28,600	1.71
50.....	15	10,900	2.38	12,900	2.26	17,700	2.00	21,500	1.88	26,000	1.79
100.....	40	43,700	1.44	51,500	1.41	68,500	1.35	85,600	1.32	102,800	1.29
100.....	30	33,000	1.59	38,800	1.55	52,000	1.47	65,000	1.41	78,000	1.38
100.....	25	26,800	1.73	33,800	1.63	44,300	1.55	56,000	1.48	67,500	1.44
100.....	20	24,500	1.80	28,600	1.75	33,700	1.75	48,200	1.56	57,200	1.52
100.....	15	21,800	1.89	25,800	1.83	25,400	1.96	43,000	1.63	52,000	1.58

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peak. The kilowatt-hours consumed per month, as shown in the annexed table, are based on a month having 26 working days. If the wagons are operated more than 26 days per month, the rate earned would be slightly less than that shown in the tabulation.

"It should also be noted that the kilowatt-hours consumed per month have been based upon manufacturers' ratings of battery equipments and mileage, and upon the assumption that the current would be purchased from the central station company at approximately 115 volts, direct current. Should transforming apparatus be necessary, owing to the garage of the user being located beyond the limits of the direct current territory, the cost of power would be increased, dependent upon the losses in the transforming apparatus. This, however, will not materially affect the cost of operating the wagons, as it will be noted that the electrical energy constitutes but a very small percentage of the total operating expense of an electric motor wagon."

MOTOR GARBAGE TRUCKS.

Chicago's first experiment with motor trucks as conveyances for the removal of street sweepings and refuse began on May 23 last, with the possibility that power wagons may supplant the old dump carts for this work if the tryout is satisfactory to city officials.

The experiment is confined to the First ward, where two machines are traveling between refuse boxes and the loading platform at South Water street and the Illinois Central tracks. Thirteen dump carts hauled by horses have been required to remove the contents of the boxes and the success of the modern trucks will depend on how much more work can be accomplished by their use. The test, it is said, will be whether they can replace enough carts to make them pay.

Acting Superintendent of Streets Frank Solon asserts that a new scheme of handling refuse boxes should go with the installation of motor wagons, but as the purchase of hundreds of additional boxes is required to carry it out the city will not spend the money for the boxes until sure that the machines are a success.

The ultimate plan is not to dump the contents out of the boxes, as is done in the case of the dump carts, but to load box and all on the truck. The trucks are to carry a supply of boxes, and place an empty one wherever a full one is picked up.

Because of the shortage of boxes much of the work in the experiment will be duplicated, but allowances will be made for the extra labor, officials of the street department assert. The trucks are scheduled to leave the First ward yards at 7:30 a. m. daily, proceed to the southern limits of the ward and work north.

The full boxes will be loaded onto the power wagons, which have a capacity of three tons, and as soon as a load is obtained they will be taken to the loading platform, emptied and returned to the pick-up spot.

Chattanooga, Tenn., has also ordered a motor garbage truck, and the successful use of three such machines in Augusta, Ga., foreshadows their ultimate general adoption all over the country.

BIG PURCHASES OF FIRE MOTORS.

In addition to New York, Boston, Chicago, Pittsburgh, and Philadelphia, many other cities are contemplating the expenditure of large sums for motor fire apparatus. Bids have been advertised for in several cases. Among others, Scranton, Pa., will spend $41,000, Boston has appropriated $50,000, Cincinnati will soon have a bond issue of $160,000, Columbus (Ohio), has issued bonds for $50,000, Portland (Ore.), is advertising for sealed proposals on 10 pieces of motor fire apparatus (bids to be received not later than June 27), the fire chief of St. Joseph (Mo.), recommends a bond issue of $75,000 in his annual report, and so on down the list. In all, about $3,000,000 worth of motor fire apparatus will be purchased or ordered during the present year, and the outlook for 1913 is even more favorable.

The list of cities and towns known to be seriously contemplating the purchase of motor fire apparatus is as follows:

Hot Springs, Ark.
Grass Valley, Cal.
San Diego, Cal.
Sacramento, Cal.
Santa Clara, Cal.
Bridgeport, Conn.
Danbury, Conn.
New Britain, Conn.
New London, Conn.
Trinidad, Colo.
Wilmington, Del.
DeLand, Fla.
Tampa, Fla.
Chicago, Ill.
Danville, Ill.
Dixon, Ill.
Joliet, Ill.
Rock Island, Ill.
Sterling, Ill.
Anderson, Ind.
Bluffton, Ind.
Hartford City, Ind.
Indianapolis, Ind.
LaFayette, Ind.
LaPorte, Ind.
South Bend, Ind.
Sioux City, Ia.
Frankfort, Ky.
Lexington, Ky.
Louisville, Ky.
New Albany, Ky.
Brunswick, Me.
Norway, Me.
Baltimore, Md.
Braintree, Mass.
Campello, Mass.
Gardiner, Mass.
Haverhill, Mass.
Lawrence, Mass.
Middleboro, Mass.
Milford, Mass.
Newburyport, Mass.
North Andover, Mass.
Pawtucketville, Mass.
Pittsfield, Mass.
Quincy, Mass.
Revere, Boston, Mass.
Salem, Mass.
South Framingham, Mass.
Stoneham, Mass.
Stoughton, Mass.
Waltham, Mass.
Ware, Mass.
Watertown, Mass.
Ann Arbor, Mich.
Benton Harbor, Mich.
Little Falls, Minn.
Minneapolis, Minn.
St. Louis, Mo.
Dundee, Neb.
Grand Island, Neb.
Omaha, Neb.
Nashua, N. H.
Highland, N. J.
Hackensack, N. J.
Ocean Grove, N. J.
Amityville, N. Y.
Brooklyn, N. Y.
Cypress Hill, N. Y.
Jamestown, N. Y.
New Rochelle, N. Y.
Olean, N. Y.
Peekskill, N. Y.
Schenectady, N. Y.
Syracuse, N. Y.
Wantagh, N. Y.
Yonkers, N. Y.
Ashland, Ohio.
E. Liverpool, O.
Marietta, O.
Baker City, Ore.
Freedom, Pa.
Johnstown, Pa.
Lansdowne, Pa.
Meadville, Pa.
Millerton, Pa.
Hollidaysburg, Pa.
Milton, Pa.
Scranton, Pa.
Sharon, Pa.
Pawtucket, R. I.
Memphis, Tenn.
Murfreesboro, Tenn.
Nashville, Tenn.
Abilene, Texas.
Dallas, Tex.
Houston, Tex.
Temple, Tex.
Waco, Texas.
Barre, Vt.
Claremont, Vt.
Richmond, Va.
Edgewood, W. Va.
Tacoma, Wash.
Walla Walla, Wash.
Appleton, Wis.

The terminals of the Merchants and Miners Transportation Co. in Jacksonville, Fla., will be provided shortly with electric baggage trucks.

The Commercial Motor Users' Association of Great Britain is considering the establishment of a series of official garages for motor wagons.

Motor parcels post between London and Birmingham, England, has been so successful, that the service will probably be extended to Manchester, which is 200 miles from London.

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Alabama.

Birmingham has 18 pieces of motor fire apparatus now, at least one for every fire station in the city.

* * *

California.

Los Angeles has received two 80-hp. motor chemicals.

Richmond has acquired a new motor chemical. A bond election for $50,000 will be held for further improvements in the fire department.

Sacramento has ordered two motor chemicals, to cost $9,500 each.

San Diego's fire chief has a new $2,475 automobile.

Stockton has a new motor fire engine.

Visalia has ordered a motor pump and chemical engine.

* * *

Colorado.

Colorado Springs has installed a motor fire truck.

Pueblo will install a 100-hp. motor pumping engine.

* * *

Connecticut.

Bridgeport's fire chief has a new motor car.

Danbury has installed a motor pumping engine and hose wagon.

Fair Haven East will install a motor chemical.

Hartford's fire chief has a new runabout.

New Haven has purchased runabouts for two assistant fire chiefs.

Seymour has accepted as a present an old motor car and will convert it into a motor chemical truck.

* * *

Florida.

Jacksonville will install a motor aerial truck. Two motor fire trucks have recently been placed in commission.

* * *

Georgia.

Columbus has installed a $9,000 motor chemical, hose and ladder truck.

* * *

Illinois.

Champaign has received a motor chemical.

DeKalb has installed a motor fire truck. The old horse drawn chemical has been sold to Iron River, Mich.

Elgin will probably sell its old combination fire wagon to Geneva, and buy motor equipment.

Peoria has formally accepted its two motor fire engines.

Springfield will probably issue bonds for $20,000 to buy motor fire apparatus.

* * *

Indiana.

Gary will buy another motor hose and chemical.

* * *

Iowa.

Davenport will be asked to furnish $75,000 to rehabilitate the fire department.

Sioux City expects its $9,000 motor fire truck by June 1.

Kansas.

Topeka has installed a motor chemical, hose and ladder truck

* * *

Louisiana.

New Orleans is motorizing an old water tower truck. From $10,000 to $15,000 in bonds will be issued to purchase new fire motors.

Shreveport has advertised bids (closed May 14 last) for a motor combination hose and chemical, two motor pumping engines and hose wagons, one motor tractor for an aerial truck and one chief's car.

* * *

Maryland.

Baltimore will purchase a $3,000 motor hook and ladder truck for the Roland Park station. Two motor fire engines have been ordered by the Baltimore county commissioners for use at Gardenville and Arlington. They will be similar to those in use at Roland Park and Catonsville. Highlandtown, Govans, Towson and Pikesville have requested the commissioners for motor fire engines. Towson and Govans will probably get theirs before the end of the year.

* * *

Massachusetts.

Boston will shortly purchase 13 pieces of motor fire apparatus, including 3 combination ladder trucks, 3 combination hose and chemicals and 7 runabouts for the district fire chiefs.

Campbello has installed a motor hose and chemical.

Gardner will buy two motor chemical engines at a cost of $12,000.

Lenox has ordered a motor hook and ladder truck.

Lowell will buy runabouts for two assistant fire chiefs.

Lynn has installed a motor utility wagon.

Pittsfield has ordered a motor hook and ladder truck.

Revere has voted to buy a motor fire truck and a chief's automobile.

Rockland, on June 9, will have a $5,500 motor fire truck.

Stoughton has raised over $5,000 to buy motor fire apparatus.

Springfield has ordered two motor combination wagons, a lifesaving car and a chief's wagon, to cost $15,000 in all.

Taunton has installed a motor hose and chemical wagon.

Watertown has ordered for August delivery a $5,800 motor hose and chemical wagon.

* * *

Michigan.

Battle Creek has installed a motor pumping engine.

Detroit has appropriated $59,500 for motorizing ladder company No. 6, $30,700 for a new engine company and $17,505 for a flying squadron to be located at engine company No. 18. A new $10,000 motor fire engine, equipped with a self-starter, has been installed.

Hancock's motor ladder truck can be operated by any member of Ladder Company No. 1, to which it is assigned for duty.

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Nebraska.

Kearney has installed a motor fire engine. Every member of the fire department will be taught to operate it.

* * *

New Hampshire.

Franklin has installed a motor fire truck.

Manchester has a motor fire engine.

* * *

New Jersey.

Atlantic City has purchased roadsters for two assistant fire chiefs.

Camden's fire chief has a new automobile.

Hackensack has installed a motor tractor.

New Brunswick will buy a motor fire truck.

Ocean Grove will completely motorize its fire department. A motor fire engine and a motor hook and ladder truck are on order. A motor chemical is already in service. The two new pieces will cost $14,500.

Paterson will install a motor chemical.

Plainfield will spend $3,000 in converting a horse chemical to motor apparatus.

Ridgefield Park has a motor chemical.

Trenton's fire chief has a new steam motor car.

West Hoboken has ordered a $5,150 motor fire truck, for delivery July 1.

* * *

New York.

Albion has ordered a motor hose, chemical and ladder truck.

Binghampton will add two or three motor combination chemicals to its fire department.

Dunkirk has installed a motor hose and chemical.

New Rochelle has installed a motor car for the fire commissioners. A bond issue of $21,000 for motor fire apparatus may soon materialize.

New York city has 43 pieces of motor fire apparatus.

Niagara Falls has purchased a fire chief's automobile for $1,775, a motor hose and chemical for $5,500 and a motor fire engine for $10,000.

Rochester has installed a motor hose and chemical, costing $5,221.

Utica has a motor chemical.

Watertown has installed a motor fire engine.

* * *

Ohio.

Akron has appropriated $8,500 to buy a motor chemical, pump and ladder truck.

Cincinnati will buy three $10,000 motor fire engines, four $5,300 motor hose and chemicals, two $10,000 motor aerial ladder trucks, two $7,000 motor service trucks and two automobiles for assistant fire chiefs.

Columbus will buy four motor hose and chemicals and six tractors for the fire department; $50,000 has been provided to cover the cost of these ten pieces of apparatus.

Marietta has ordered an $8,000 motor pump, hose and chemical wagon.

Marion has installed a motor fire engine.

Norwalk will soon have a motor fire engine.

Zanesville will purchase a motor fire engine, to cost $9,000 or $10,000.

* * *

Pennsylvania.

Altoona is investigating motor fire apparatus with a view to purchase.

Butler has ordered a motor fire truck.

Easton is considering bids for a motor hose and chemical.

Lewistown has ordered, for delivery July 1, an air-cooled motor fire truck.

Mahanoy City has a motor chemical.

Meadville is considering bids for an $8,000 motor fire truck.

Milton is subscribing for motor fire apparatus for the Shimer Hose Company.

Pittsburgh has contracted for six motor hose and chemicals at a cost of $5,250 each. The city has two such machines in service at present.

Pottstown has levied a special tax to pay for a $5,387 motor fire truck which was recently ordered.

Reading has invited bids for a motor combination fire wagon, and will motorize existing horse apparatus.

Wilkesbarre has ordered a $9,000 motor fire truck. Fire insurance rates will be reduced when it arrives.

* * *

Tennessee.

Memphis will buy a motor fire wagon.

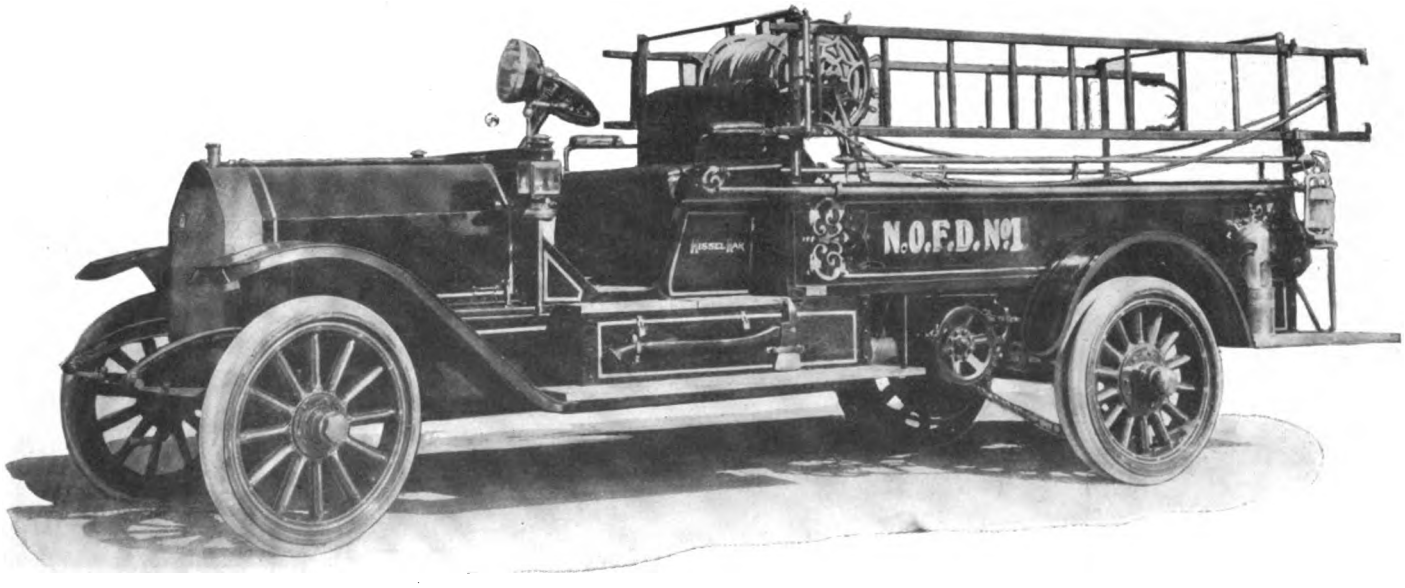
Nashville is considering the appropriation of $25,000 for the purchase of three combination motor fire engines. The bill for this has passed its first reading.

* * *

Texas.

Cuero will pay off $1,300 worth of scrip outstanding against the city for the purchase of fire motors

Yoakum has installed a motor fire engine.



Kissel Kar motor hose truck which made new records at New Orleans. Chief Pujol said: "We made the run of three miles, coupled up the hose, and threw water, all in 6¾ minutes. During the run we had to halt four times for other vehicles, and make four turns that were dangerous."

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Vermont.

St. Johnsbury has purchased a $5,800 motor hose and chemical, for delivery August 1.

* * *

Washington.

Aberdeen has installed a motor fire engine, and fire insurance rates have been cut all the way from 5 cents to $1.00 on every $100 worth of insured property.

Hoquiam has installed a motor fire engine and hose wagon.

North Yakima's motor apparatus was the cause of a recent visit from a delegation of city officials from LaGrande, Ore.

Wisconsin.

Chippewa Falls may purchase a motor hose truck.

Eau Claire has installed a motor fire truck.

Milwaukee will buy a number of runabouts, not to exceed $1,000 each in price, for the assistant chiefs of the fire department.

Racine has received its second motor fire truck.

* * *

Note:—A list of 106 cities and towns known to be in the market for motor fire apparatus is given on page 45 of this issue, in an article entitled "Big Purchases of Fire Motors." It is probable that several of these will have placed orders before this issue goes to press.

Dealers Recently Appointed.

Town and State.	Agent.	Make of Truck.
Birmingham, Ala.	Highland Garage Co.	Alco
Oakland, Cal.	Kiel & Evans	Commerce
San Francisco, Cal.	Harwood-Barley Mfg. Co.	Harwood-Barley
New Haven, Conn.	Bradford de Bussy Co.	Hatfield
New Haven, Conn.	Cowles Tolman	Kelly
Union City, Conn.	Union City Auto Co.	Monitor
Washington, D. C.	Motor Truck Corporation	Little Giant
Jacksonville, Fla.	Jacksonville Machine Works	Kelly
Jacksonville, Fla.	Jacksonv'le RegalMotorCo.	Harwood-Barley
Jacksonville, Fla.	Merrill-Stevens Co.	G. M. C.
Aurora, Ill.	Wolf & Parker	Monitor
Chicago, Ill.	Commercial Motor Vehicle Co.	Piggins
Chicago, Ill.	Randolph M. T. Co.	Randolph
Danville, Ill.	N. E. Holden	Alco
Black Oak, Ind.	Harry Ewen	Kelly
Evansville, Ind.	F. W. McNeely & Co.	Kelly
Evansville, Ind.	Advance Auto & Machine Co.	Alco
South Bend Ind.	Otis M. C. Co.	Kelly
Dubuque, Iowa.	Dubuque Rambler Auto & Supply Co.	Alco
Hopkinsville, Ky.	Fred Schmidt	Kelly
Boston, Mass.	Bessemer M. T. Co.	Bessemer
Boston, Mass.	C. J. Fisher	Garford
Boston, Mass.	C. J. Fisher	Gramm
Boston, Mass.	C. J. Fisher	Overland
Boston, Mass.	Chas. A. Mailey	Universal
Boston, Mass.	Pratt Engine & Boat Co.	Mercury
Boston, Mass.	W. L. Russell Co.	Veerac
Boston, Mass.	Wm. L. Taylor	Lansden
Boston, Mass.	Woodworth M. T. Co.	Federal
Gloucester, Mass.	Percy W. Wheeler	Mercury
Greenfield, Mass.	W. M. Cutler	Mercury
Haverhill, Mass.	Ford & Luce	Mercury
Medford, Mass.	Teel Mfg. Co.	Federal
North Attleboro, Mass.	E. R. Crossley	Sandusky
Lewiston, Me.	Auburn Garage	Dart
Bay City, Mich.	Wenonah M. C. Co.	Wenonah
Detroit, Mich.	Universal M. T. Co.	Universal
Escanaba, Mich.	Delta Hardware Auto & Supply Co.	Monitor
Minneapolis, Minn.	Chase M. T. Sales Co.	Chase
Minneapolis, Minn.	Pince Auto Co.	Federal
Minneapolis, Minn.	Plant Rubber Co.	Kelly
Kansas City, Mo.	H. E. Wilcox Motor Co.	Wilcox
St. Louis, Mo.	Marshall Bros. Livery Co.	Hatfield
Charlotte, N. C.	N. J. Sherrill	Chase
Gloversville, N. J.	J. August Schmidt	McIntyre
Newark, N. J.	Motor Wagon Co. of N. J.	White Star
Newark, N. J.	Motor Wagon Co. of N. J.	Detroit Elec.
Newark, N. J.	Nuss Wagon & Auto Co.	McIntyre
Newark, N. J.	Nuss Wagon & Auto Co.	Sternberg
Buffalo, N. Y.	Overland Buffalo Co.	Overland
New York City, N. Y.	Doull Miller Co.	Kelly
Rochester, N. Y.	Ball-Washburne Motor Co.	Kelly
Syracuse, N. Y.	T. P. Anderson	Alco
Syracuse, N. Y.	W. H. Bissell	I. H. C.
Syracuse, N. Y.	Overland Syracuse Co.	Garford
Syracuse, N. Y.	W. R. Shaw	Sandusky
Syracuse, N. Y.	T. A. Young	Peerless
Cleveland, Ohio.	International M. Co.	Mack & Saurer
Dayton, Ohio.	Standard M. C. Co.	Lippard-Stewart
East Liverpool, Ohio.	Potter M. C. Co.	Kelly
Ottawa, Ohio.	H. L. Spalt	Kelly
Portsmouth, Ohio.	William K. Patterson	Alco
Tiffin, Ohio.	R. W. Miller	Kelly
Baker City, Ore.	Harwood-Barley Mfg. Co.	Harwood-Barley
Portland, Ore.	Gerlinger Motor Co.	Little Giant
Portland, Ore.	E. W. Hill	White
Charleroi, Pa.	W. B. Pfeghardt	
Philadelphia, Pa.	Indiana Motor Sales Co.	Harwood-Barley
Philadelphia, Pa.	Steckle M. T. Co.	B. O. E.
Philadelphia, Pa.	Steckle M. T. Co.	Lincoln
Plymouth, Pa.	S. Reese Machine & Tool Wks.	Lincoln
Reading, Pa.	D. B. Hoffer	Kelly
Scranton, Pa.	Lawrence M. Connell	Alco
Providence, R. I.	Teel Mfg. Co.	Mercury
Providence, R. I.	Frank Riley Co.	Mercury
Charleston, S. C.	H. L. Koster	Kelly
Rapid City, S. D.	Thomas Roush	Kelly
Beaumont, Tex.	Stedman Fruit Co.	Kelly
Ft. Worth, Tex.	H. H. Lewis, Jr.	Kelly
San Antonio, Tex.	Alamo Automobile Co.	Federal
Norfolk, Va.	T. S. Sager	Kelly

San Bernardino, Cal., proposes to limit the gross weight of motor wagons to 15 tons, in order to protect the county bridges.

Bids of from $5,996.50 to $7,200 have been made to furnish motor wagon mail service to Oakland, Cal., with three machines.

Boston at present permits motor wagons to stand in the streets for 30 minutes. An application has been made to double that time.

Miss Ethel Freese, an 18-year-old girl of Napanee, Ind., frequently drives the big motor wagon used by her father in his creamery business.

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PROGRESSIVE PLAN FOR LOS ANGELES.

The establishment of a motor truck transportation system along unique lines between Los Angeles' business section and the harbor was outlined by E. P. Dargin, of that city in a recent letter to the harbor commissioners.

Mr. Dargin suggested that motor trucks equipped with both trolley apparatus and storage batteries be run to the harbor, part of the way on tracks, the remainder of ths distance, for the sake of distribution of shipments to consignees, on storage batteries.

He declares that this method of shipment will reduce the cost of shipments in heavy bulk to practically 50 cents a ton. The cost of shipments now is about $1.20 a ton. Until the harbor commissioners got a reduction in the rates it was $2 per ton.

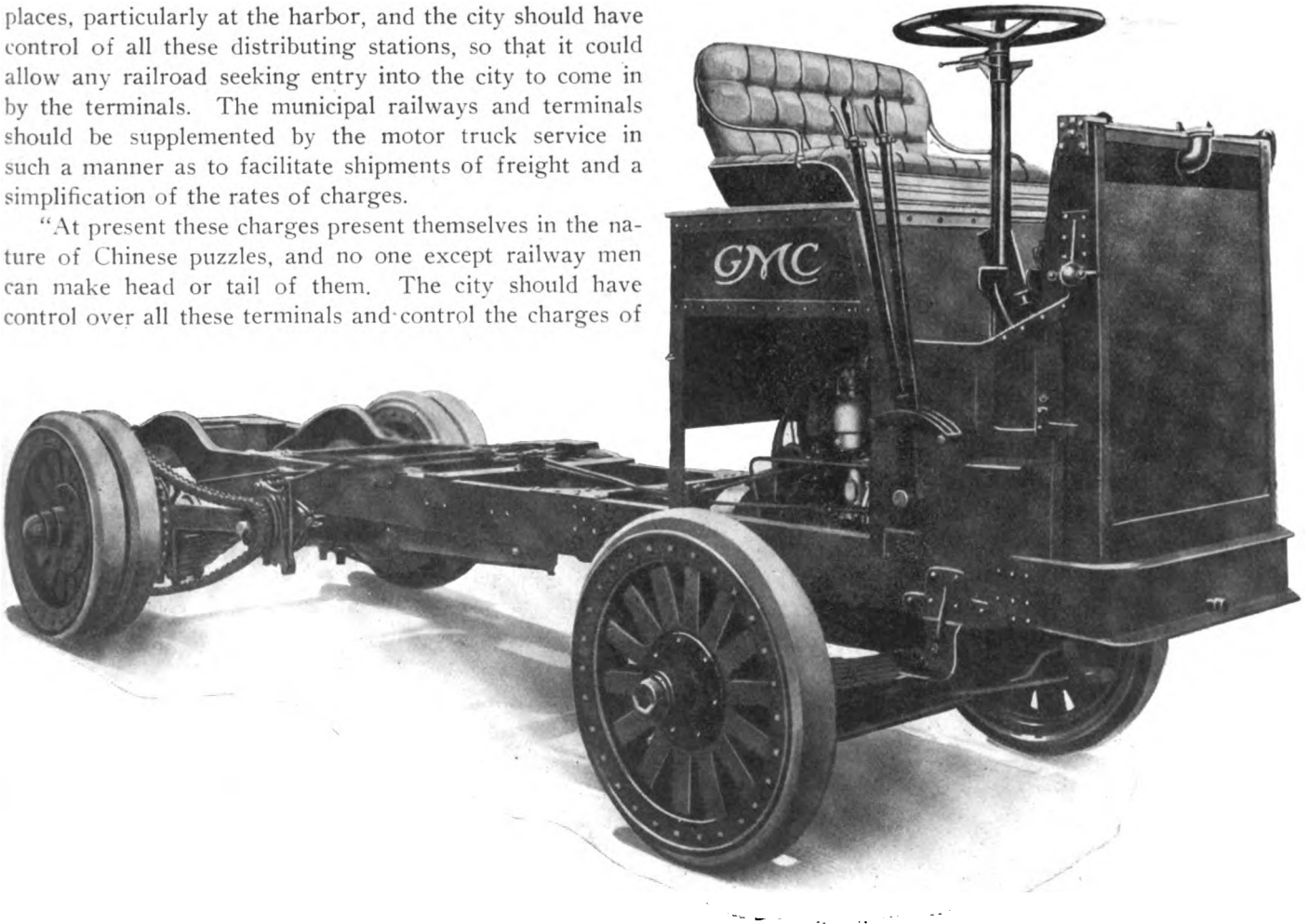
Secretary A. P. Fleming and the harbor commissioners are striving to obtain for the city two additional "track districts" in which shipments are distributed by the various railroads and street railways for fixed charges. The city already has five of these track districts. They are at the Arcade depot, Naud junction, River station, Winthrop, at the junction of Main and Jefferson streets, and at the University. The harbor commissioners want the two additional districts created at San Pedro and Wilmington.

"This suggestion of Mr. Dargin's," said Mr. Fleming, "looks good to me. It is distinctly along the line of what we are striving for and which, we believe, will have to come. We should have a municipal terminal at these places, particularly at the harbor, and the city should have control of all these distributing stations, so that it could allow any railroad seeking entry into the city to come in by the terminals. The municipal railways and terminals should be supplemented by the motor truck service in such a manner as to facilitate shipments of freight and a simplification of the rates of charges.

"At present these charges present themselves in the nature of Chinese puzzles, and no one except railway men can make head or tail of them. The city should have control over all these terminals and control the charges of freight and wharfage. These rates should be so arranged as to be easily understood by anybody, and the wharf charges should be left to take care of themselves. If the wharf charges are too low, they can be raised; and, if too high, they can be lowered. I think that Mr. Dargin's suggestion is timely, and it will be considered at the next meeting of the harbor board."

G-M-C UNDERSLUNG CHASSIS.

Power wagon designers are greatly interested in the new underslung chassis recently brought out by the General Motors Truck Company, Detroit, Mich. Its advantages, summed up, are as follows: The 3½ and 5 ton underslung spring chassis is built to answer a demand for a truck of this type, allowing loading and unloading with ease. The merit of this construction is that the top of the chassis frame and the body is lower to the ground than it is in the standard chassis. This is brought about by placing the springs under the axles, thereby gaining the space taken by the springs in the standard construction. In addition to this, the frame is brought still lower by the frame side members being raised over the axles. The value of the underslung springs is that in loading with very heavy materials, the body lowers as the load increases and when capacity is reached, the top of the chassis at rear is only 24 inches from the ground. Hence, heavy loads are easily loaded and unloaded.



New G-M-C underslung truck.

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The Motor Wagon in Louisville.

A Critical Commentary on Power Wagon Use in a Typical City.

By G. D. CRAIN, JR.

THE DEVELOPMENT of the power wagon in Louisville, Ky., is perhaps typical of conditions over the entire South. Louisville is the second largest city in the territory south of the Ohio and east of the Mississippi river, and though it is a border town, and for that reason has received many of its impressions and opinions from the North and East, it is characteristically and essentially Southern. This means chiefly that the habits of its business men are rather fixed; that changes are not made rapidly, and that the tendency to hold on to the old until it is absolutely pushed out by the new is more strongly marked than it would be in some smaller cities located in other sections.

It is only fair to say, however, that the conservatism which was an obstacle to the rapid advancement of the motor truck, has turned out to be an advantage, now that this form of transportation has been tested and proven, and has won a place as an economical and efficient aid in the handling of goods. Therefore the foundation for the power wagon in Louisville, as in the South, while slow in building, is strong and well-laid. The fact that less than 100 machines are in service at the present moment in Louisville means simply that there is a great field there which is open for development, and that those which have been in use have been not merely serving their owners, but have acted as indicators for other business men who have desired to witness the complete try-out of cars before investing on their own account.

* * *

Impediments to Development.

In addition to the natural slowness of Louisville business men to take hold of motor trucks, retarding features were sales of cars without proper analysis of the businesses for which they were to be used, and the work of dealers who were not equipped to take care of customers after they got them. Partly on account of inefficient service, which resulted in high expense bills and poor operating results, and partly because of big cars being sold for work where smaller cars would have done better, and vice versa, some marked failures were recorded, the result of which was the insertion of large "For Sale" advertisements in the newspapers. The business man who read that the concern which had only a few months before invested $3,000 in a motor truck and was now ready and willing to sell it for one-third of that figure, was naturally impressed with the fact that the investment had not been a good one.

The motor truck business, as well as the passenger car trade, has gotten down on a safe and sensible basis, however, and this means that a steady advance can be counted on. The manufacturers and dealers now in the field are in a position to take care of owners, and to give them the sort of service which will result in low maintenance figures and good operating records. They are experienced, too, and are not likely to make mistakes in trying to sell a car which is incapable of performing the work which it is called on to do. The trade outlook being good, the situation as far as the extension of the use of power-driven vehicles is correspondingly favorable.

* * *

Rebuilt Pleasure Cars Fail to Make Good.

A feature of the local situation which has been generally remarked upon is that the motor wagon was given a black eye through the failure of rebuilt passenger cars to make good. Many business men not thoroughly informed on the subject took it for granted that putting a freight body on a passenger chassis was creating a motor truck, and that the results secured from this sort of makeshift could be considered as fairly indicative of the worth, or lack of it, of the regulation truck. Some of these rebuilts gave good service; others were overloaded, not properly taken care of and turned out to be failures, and their owners thereupon announced that the motor truck was no good for their business. Converting some of these experimenters has been one of the chief difficulties of those connected with the business. It has likewise emphasized the fact that manufacturers might well make a good point with prospective purchasers in telling them that experience with a car which was originally built to carry passengers, and whose load capacity was therefore comparatively small, is no safe guide in passing judgment upon a car which is built in the first place for the handling of freight and not passengers.

* * *

Negroes Not Successful as Drivers.

The Louisville situation is somewhat unusual and interesting by reason of another fact. That is the general use of negroes as teamsters. The preponderance of negroes in the lower classes of labor has led to the owner of a business which is considering turning over its horse-drawn equipment in favor of the motor drive, trying to carry forward the world with black helpers. In a few exceptional cases these have shown sufficient apititude to make good drivers and mechanicians. In more, however, they proved absolutely incapable of being taught how to operate a motor truck, and as long as they were retained good records with trucks were out of the question. This led to some dealers insisting that the purchaser of a car either put in a driver furnished by the dealer, or that the purchaser put his own driver in the shop of the concern selling the truck so that the erstwhile horse driver could get practical experience as to the handling of the working parts and learn the essential features of the car's construction. After that, if the tyro proved to be capable, the dealer recommended that he be used; if not, it was pointed out to the owner that in order to get good results, it was absolutely necessary to secure efficient drivers, and the record of the employe of the purchaser was pointed out. In most cases this led to a recognition of the facts and to the employment of a man qualified to operate a machine.

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Louisville Keenly Interested in Motor Wagons.

While the number of motor wagons in use in Louisville is small, it is by no means an indication of the number of people who are interested in and are studying commercial motor vehicles. On the other hand, a local concern which entered the manufacturing field last fall made a canvass of many large concerns before deciding to start its factory work, for the purpose of determining whether it could expect to get any business in Louisville. It found that hundreds of concerns are contemplating the purchase of motor wagons and will buy as soon as they are convinced they can save money by substituting them for horses and wagons. That is to say, there are plenty of prospective purchasers, and the longer the educational work goes on, and the longer cars now in service continue to operate satisfactorily, the stronger will be the tendency of these prospects to buy.

Some trucks have been in service for several years. A greater number, however, have been operating for less than a year. Thus the demonstration of cars in use, on the basis of durability and depreciation, has not proceeded as far as it has in some other communities. The constant additions to truck service which have been made in the past year particularly, a flour mill adding a small car to its department for short hauls; a brewery putting on a bigger truck for the distant deliveries; a cooper putting on another heavy-duty truck of the same capacity, finding the service of the first eminently satisfactory, has been impressive, and the percentage of re-sales are sufficient enough to prove beyond cavil that the power wagon has made good with a large percentage of users.

* * *

Accurate Cost Keeping Needed.

One of the obstacles to real advancement has been the lack of accurate statistics on the subject of operating costs. Few owners knew just what it was costing them to conduct their delivery departments under the horse and wagon plan. They knew in a general way what the cost of running the department was, but they had little idea of the package delivery cost, the ton-mile cost for heavy commodities, or similar data. Similarly, with the exception of a few large institutions, there has been little done by owners of motor trucks in the direction of arriving at the exact costs of operation. And inasmuch as comparison with the old method is almost impossible, accurate figures showing the economies which have been effected are unusual. In most cases the owner says merely that he is satisfied with the machine, and believes it is giving good service. How much he is saving, or whether he is saving anything, are matters of doubt. As indicated, some of the larger houses have more elaborate systems for working out these facts, and it is significant that those which are so equipped are able to make the most enthusiastic comments on the subject of motor trucks.

* * *

Louisville Topography Suits the Machine.

Louisville is, topographically, favorably situated for motor truck operation. Its streets are level, while south of the city rise hills which for the most part are steep, although there are some sharp ascents in the neighborhood. Roads around the city are well kept as a rule, in sharp contrast to some of the city streets. These are wood block, asphalt, brick and macadam, granite also being found in sections where there is much heavy hauling to be done. The urban thoroughfares are not as a rule in good repair, asphalt streets particularly having been allowed to get in bad shape in some parts of the city. The location of Louisville is such that the climate for the greater part of the year is favorable to the motor wagon. While severe weather is experienced in the winter, it is seldom of long duration, and trouble due to water in the radiators freezing is exceptional.

Louisville is a river town, and a good deal of traffic comes in by way of the Ohio. The roads leading to the wharf are remarkably steep, and as many of the wholesale houses on Main street, the first street south of the river, get supplies from this section, horses and wagons can be used to advantage. It is probable that for these short hauls, up steep grades, trucks can show little superiority over the present equipment. However, numerous wholesalers are using trucks for city delivery purposes and are finding them an advantage.

* * *

Big Field for Professional Operators.

The fact that many transfer companies are flourishing in the Kentucky metropolis, and that many large concerns have all of their hauling done by contract, is a feature which is of interest in this connection. Louisville is the largest leaf tobacco market in the world, and lower Main street is filled with immense warehouses where the staple is stored in hogsheads weighing from 600 to 1,000 pounds. None of the warehouse companies does its own hauling, the transfer companies handling it by contract. As this work is extremely difficult, and frequently involves hauling the hogsheads from the freight depots to the warehouses, a distance of over a mile, it would appear that here is a good field for the motor truck. In fact, the freight handling companies have begun to try out the commercial motor vehicle, one large concern having a 3-ton machine which is being used to good advantage in handling furniture and other goods of this kind. The contracting teamsters have been noting the steady advance in the price of all kinds of feed, this item of expense having been larger during the past winter than ever before in the history of the city. In some cases the advance amounted to 50 per cent, and as the weather was unusually severe, making the work more difficult to handle, it is safe to assume that the teaming companies found that their operating expenses were larger than ever, in proportion to the business handled. The expense of operating a motor truck, without considering the increased amount of work it can do, is therefore certain to look smaller than it did when the cost of feed was less.

* * *

Distillers Need Motor Wagons.

There are numerous distilleries located in and around Louisville, all doing a large amount of hauling. It is worthy of note, however, that the first distiller to institute the use of trucks was having his work done by contract previous to that, and made the change not to effect a saving, but to secure better service. He succeeded in doing

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this, and found out that even allowing a large amount for depreciation, he had reduced the cost of delivery something like 25 per cent. He later added another truck, and is now doing all of his hauling in this way. Since then another distiller has begun handling his whisky barrels in this way, and it is likely that ultimately this entire trade will see the advantage of the plan. At all events, the chances of the truck here are splendid, and the opportunities for improving present conditions are obvious. The long hauls which have to be made, the fact that the winter is the active season, when roads are at their worst, and that many of the distilleries are located in the county outside of Louisville, combine to make the motor truck an apparently legitimate medium of effecting economy and greater efficiency in the transportation of the distillers' goods.

The gasoline car has thus far had the field almost entirely to itself. This has been due chiefly to the fact that comparatively few electric machines have been represented in Louisville. Now that a local manufacturer is turning out motor wagons of this type, it is expected that the electric will come to the front more rapidly. Two other machines operated electrically are represented here, the Waverley and the Walker. It looks as if the Kentucky Wagon Mfg. Company, of Louisville, which is turning out 1,000-pound delivery wagons, has struck a popular line, as it has been making progress on this car. It will also manufacture heavier cars.

License rates in Louisville are reasonable. The city license on all motor-propelled vehicles is $5 a year, while the state license depends on the horsepower of the machine. All cars having engines of less than 25 hp. pay $5 license; from 25 to 50 hp. $10, and over that $20. The city license on wagons is from $3 to $25 a year, depending on the number of animals used. There is no state license on wagons.

* * *

Louisville a Manufacturing Center.

Louisville now has three manufacturers of motor trucks, the Kentucky Wagon Mfg. Company, the Transit Motor Car Company and the Longest Bros. Company. The first named company is famous for the production of farm wagons, having been in this business for over forty years. The electric vehicle business was started by the Electric Vehicle Company, and Henry B. Hewett, who was president of that concern, is general manager of the motor truck division of the Kentucky company. The Longest Bros. Company has been building trucks on a small scale for several years, and is now equipped to turn out two or three a month. It makes a truck with a load capacity of from 3 to 4 tons and another with a capacity of from 5 to 6 tons. It has designed a body for coal delivery purposes which is unique in that it is divided into compartments, each of which can be unloaded independently of the remainder. This is expected to prove popular in the coal trade. The Transit company is manufacturing a gasoline car of three tons' capacity, and will turn out other heavy duty trucks from now on. The American Automobile Mfg. Company, organized in Louisville, began business in New Albany, Ind., and intended to make trucks as well as passenger cars. It went into the hands of a receiver before proceeding far with its operating plans, however.

* * *

Records of Some Local Users.

The Home Laundry Company has kept close tab on its car, which is a 30 hp. White, and figures that it is making a decided saving. The truck cost $2,600, and took the place of four horses and two wagons. The cost of upkeep for this car is $1,960 a year, $600 of which goes for tires, and $1,040 for the driver's wages. These figures do not, however, include depreciation, which, at the rate of 25 per cent, would add $650, making the total upkeep expense $2,540. The maintenance expense of the equipment displaced amounted to $2,120 a year, not including depreciation of equipment, $1,300 being for wages, $720 for feed and $100 for incidentals being the chief items. Adding a depreciation charge of $150, the total would be somewhat less than that of the power wagon, but the results secured from the latter are much greater and better, the package delivery cost being considerably reduced. The truck averages 28 miles a day and 250 stops, or 10,000 miles a year and 90,000 stops. The desirability of the machine is appreciated, especially in view of the growth of the city, which has increased the territory covered by the laundry over 100 per cent in five years.

R. E. Wathen & Co., distillers, use two three-ton Packard trucks. In order to get the highest degree of efficiency from their drivers, the company has offered a bonus of $100 to the driver and $25 to the assistant on the truck showing the lowest cost per ton-mile in a year. The plan has already had good effect, the drivers vying with each other to keep their cars in good condition and to get the most out of tires, gasoline and oil. The Miles Auto Company, which sells Packards in this territory, has offered a bonus of $100 a year to the driver making the best showing for his machine.

Of the transfer companies using trucks, the Hammersmith Transfer Company, which has a three-ton Kelly, has done conspicuously good work, hauling furniture as far as 40 miles, over steep hills, to Louisville, and enabling the delivery to be made without the necessity of crating, draying to the depot, loading, unloading, and uncrating. The economy and convenience from the standpoint of the patron of the company are marked. The Motor Van Company, which moves furniture, is using two three-ton Kelly trucks.

Ahrens & Ott, the Louisville branch of the Standard Sanitary Mfg. Company, has been using trucks for several years, having two 2½-ton General Motor trucks which are taking the places of six single wagons. The trucks average from 20 to 35 miles a day and make 15 stops, considerable time being consumed in loading and unloading. That the plumbers' supply business is one to which the truck is especially adapted is shown by the fact that the Laib Company, which is in the business of jobbing plumbing goods, has two Transit trucks which are giving satisfaction.

The Chess & Wymond Company, coopers, operates two 3-ton Packard trucks, which have taken the place of

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five teams and wagons. The trucks average 60 miles a day each, and carry 90 barrels per load, to the wagon's 20 miles and 54 barrels. As the deliveries are made chiefly to distilleries, which require barrels in rush consignments, the advantage of the trucks has been apparent. The hauls are mostly from four to six miles.

Louisville is the jobbing center of the South. Trade in nearly every line radiates from Louisville throughout the southeastern section, and the development of the motor truck in the Kentucky city is therefore certain to be followed by similar progress in the territory dependent upon Louisville. The Ohio Valley city may be regarded as a sort of keystone point, and as an excellent distributing station from which to place cars through that entire section. The manufacturing enterprises which have been started are looking to the South for business, chiefly, and expect to find the territory responsive to their efforts.

Following is a fairly complete list of owners and dealers operating in Louisville at present:

* * *

Trucks in Actual Service in Louisville.

Owner.	No. and Make.	Capacity.
Falls City Brewing Co.	1 Morgan 5	ton
Frank Fehr Brewing Co.	1 " 3	"
Armour & Co.	3 Autocars 1½	ton
Falls City Brewing Co.	1 " 1½	ton
Hirsch Bros. & Co.	1 " 1½	"
Seelbach Hotel Co.	1 " 1½	"
Turner, Day & Woolworth Handle Co.	1 " 1½	"
James Greene Furniture Co.	1 " 1½	"
Jos. Denunzio Fruit Co.	1 " 1½	"
Schoppenhorst Dry Cleaning Co.	1 " 1½	"
R. E. Wathen & Co.	2 Packards 3	"
Chess-Wymond Co.	2 " 3	"
Wedekind Grocery Co.	1 " 3	"
Belknap Hdwe. & Mfg. Co.	1 " 3	"
United American Co. (distillers)	1 " 3	"
Hammersmith Transfer Co.	1 Kelly 3	"
Motor Van Co.	2 " 3	"
Standard Sanitary Mfg. Co.	2 " 3	"
Ballard & Ballard	1 " 3	"
" "	1 " 2	"
Louisville Country Club	1 " 2	"
National Ice Cream Co.	2 Rapid 1	"
Hyman Pickle Co.	1 " 2	"
Kentucky Consumers Oil Co.	3 " 1	"
Kentucky Heating Co.	2 " 1	"
Stewart Dry Goods Co.	2 " 1	"
Stratton Terstegge Co.	1 " 2	"
Falls City Meat Market	1 " 1	"
Louisville Railway Co.	1 " 1	"
Ahrens & Ott	2 G. M. C. 2½	"
Cumberland Telephone Co.	2 " " " ¾	"
George G. Fetter Co.	1 Overland ½	"
Jacob Schulz	1 " 1	"
Booth & Co.	1 U. S. 1	"
Crown Laundry Co.	1 Ford 750	pounds
Louisville Towel Supply Co.	1 " 750	"
Swiss Dry Cleaners	1 Hupp 500	"
Bagby Howe Drug Co.	1 Sampson 1,000	"
George Ehrman Bakery	1 Brush 750	"
Crystal Laundry Co.	1 " 750	"
Camp's Kentucky Dairy Lunch	1 " 750	"
Kentucky Tire & Rubber Wks.	1 " 750	"
M. J. Duffy & Sons (plumbers)	1 " 750	"
Louisville Lighting Co.	1 Walker 1½	ton
James Bros., Castleman & Blakemore	1 Gramm 1	"
James Bros., Castleman & Blakemore	1 Grabowsky 1	"
James Bros., Castleman & Blakemore	1 " 2½	"
B. F. Avery & Sons (plows)	1 Couple-Gear Electric 2½	"
Oertel Brewing Co.	1 Couple-Gear Gas Electric 3	"
Standard Oil Co.	1 Longest 5	"
Victor Cotton Oil Co.	1 Webber ½	"
Crown Laundry Co.	1 White 1	"
Home Laundry Co.	1 " 1	"
L. Hartman & Sons	1 " 3	"
Laib Co.	1 Transit 2	"
" "	1 " 1	"
Cuscaden Ice Cream Co.	1 Reo 750	pounds
Bryce Keller & Co.	1 Urban Electric 1,000	"
Kentucky Electric Co.	1 " " 1,000	"

* * *

Louisville Motor Truck Dealers.

Clark Motor Car Co.	Sampson, Reo.
Dunham Automobile Co.	Victor.
Fitch, B. F.	The Autocar.
Ford Motor Car Co.	Ford.
Glenn-Bauer Motor Co.	Flanders.
Glossbrenner Commercial Car Co.	Rapid, G. M. C., Overland.
Longest Brothers	Longest.
Miles Auto Co.	Packard.
Reimers Motor Car Co.	Locomobile, Ohio Electric.
Rommel Motor Car Co.	White, Brush.
Urwick Motor Car Co.	Baker Electric.
Killgore & Stilz	Kelly.
Waverley Co.	Waverley.
Keeler Motor Car Co.	Walker.

COST OF FIRE MOTORS.

A statement prepared by Chief Thomas Ballantyne of the Savannah, Ga., fire department, giving comparative figures on the cost of the upkeep of the motor apparatus, and the horses, shows that for a period of forty days, ending May 1, 1912, compared with the same period last year, the machines were much the cheaper.

The maintenance expense this year was $403.80 against $678.92 of last year. At that time there were 47 horses in use. Fifteen are now used in the department. Feed for the period was $605.77, while gasoline this year cost $11. Shoeing cost $62.15, while there was no expense for lubricating oils.

The feed of 15 horses for the 40 days this year was $293.90, while the gasoline bill was $66 and the oil bill $20.80. The bill of shoes was $23.05. The department now has on hand 35 gallons of gasoline which is included in the account.

Switzerland, according to a recent estimate, has 550 motor wagons.

Racine, Wis., has installed a motor wagon in its waterworks department.

Hagerstown, Md., has a motor wagon used for distributing books to 70 substations of the local library.

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Motor Bus Notes.

Activity in This Branch of the Industry is General and Widespread.

Auburn, Cal.—James Walsh, of the Hotel Freeman, has installed a 12-passenger motor bus to run between the hotel and the Nevada street depot of the Southern Pacific railway.

Williams, Cal.—The Williams-Wilbur Springs stage line, operated by Sandy Woods and W. A. Shanklin, will put on a new motor bus.

* * *

Denver, Colo.—The local agent of a motor truck company has opened a motor bus service between Denver and Brighton. Two 20-passenger machines are in use. They are making two trips a day over a route of 19 miles. Later the service will be extended to Greeley and other points.

Canon City, Colo.—Four steam cars are being used on a daily Royal Gorge sightseeing trip for Colorado Springs. A company is being organized here for a similar service.

* * *

Priest River, Idaho.—C. W. Beardmore, of the Hotel St. Elmo and proprietor of the Priest lake stage route, has installed an 18-passenger motor bus. The machine will carry mail as well as passengers.

* * *

Chicago, Ill.—"There are innumerable places within fifty miles of Chicago where a regular bus service, running daily, no matter what the condition of the weather, would prove successful," said F. W. Stewart, of the Chicago Buick Branch, recently. "Some places are large enough to support this sort of service with passenger traffic alone, while in other places the trucks could be used for hauling the goods of local merchants when they are not in use for passengers. The time is coming when every golf and country club will have a motor bus. I believe that in places like Lake Forest, Highland Park, Elmhurst and Oak Park a motor bus line carrying passengers to and from the railroad depots would pay."

Evanston, Ill.—A motor bus line has been started in this city, and later it is expected to compete with the street cars running into Chicago. Two 16-passenger electric buses are now in use, running in opposite directions, from Fountain square, along Davis street to Wesley, Dempster, Asbury, Main, Ridge, Madison, under the subway to Kedzie, to Michigan, Greenleaf, Forest, Davis and Fountain square. Machines run every 30 minutes from 7 a. m. to 7 p. m. (9 p. m. Saturdays). There is no Sunday service. Local merchants are guaranteeing the cost of maintenance.

Freeport, Ill.—Motor bus service between the end of the street car line (at Globe avenue) and the country club is now in operation. Fare, 10 cents each way. Country club members have fare coupon books.

Joliet, Ill.—The Illinois Warehouse & Commission Company will fit up its two motor trucks as sightseeing buses and will rent them to parties for use on Sunday.

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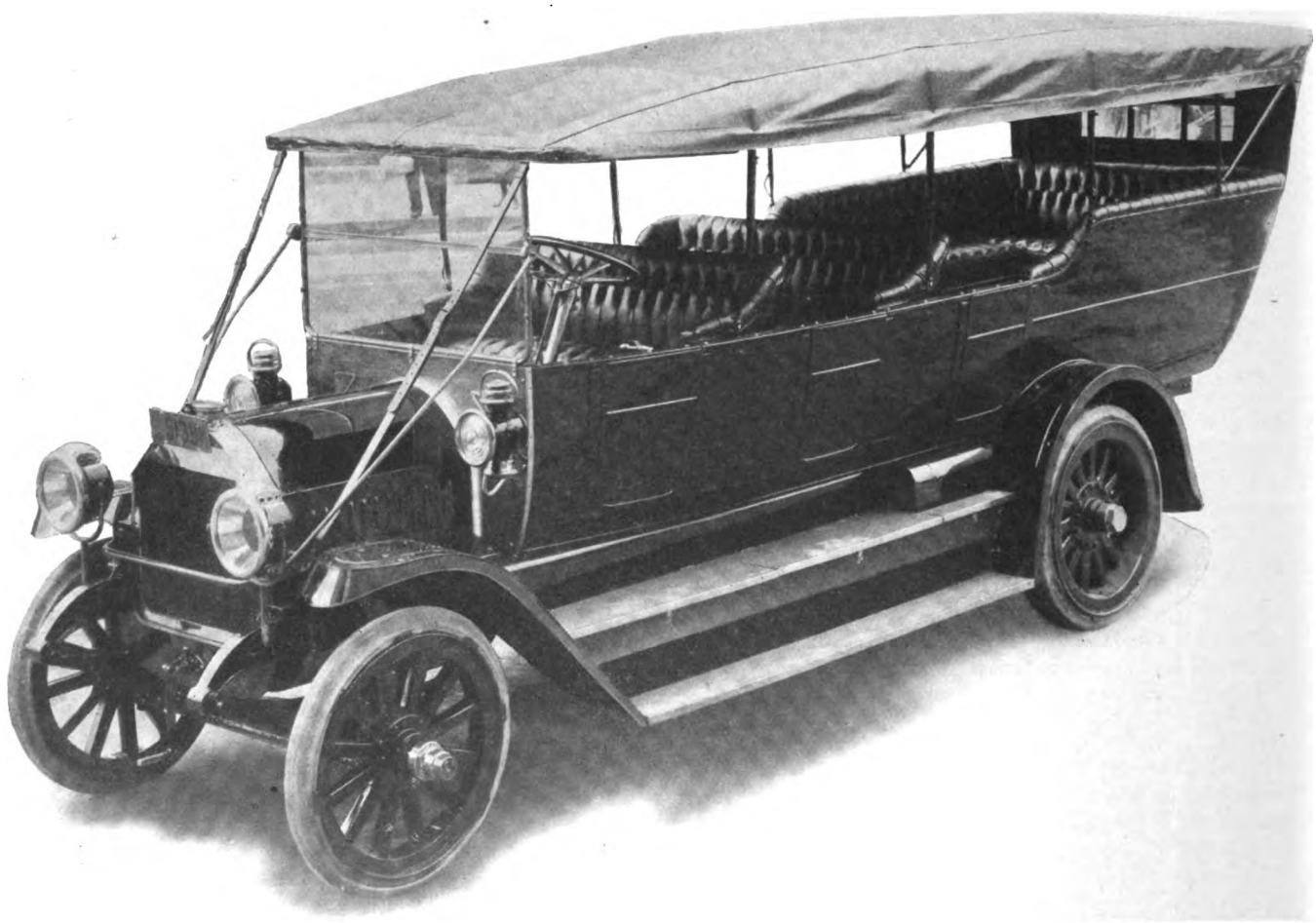
Gary, Ind.—The Gary Motor Bus Transit Company has made arrangements with the Gary Country Club for motor bus service on Saturdays and Sundays. Profitable rates have been secured.



The new G-M-C sightseeing bus, as recently supplied to a concern on the Pacific Coast.

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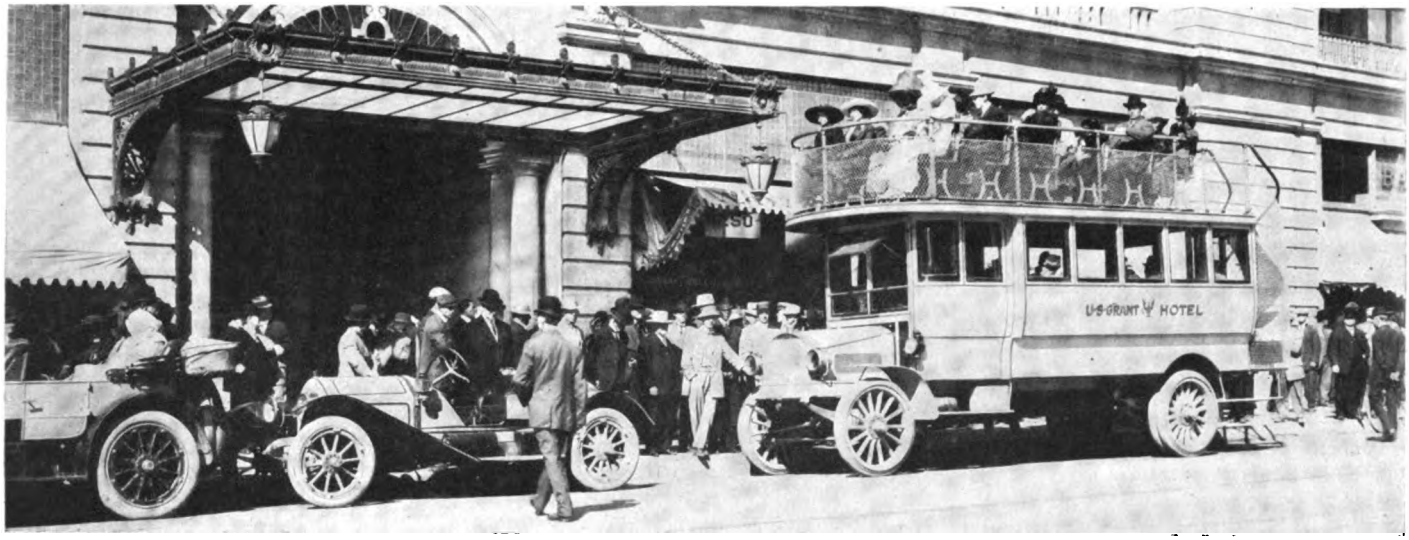

The U. S. Grant Hotel, San Diego, Cal., is noted for its up-to-dateness as well as its splendid service. This fine hotel motor bus is evidence of these facts. The chassis is a 90-hp. Mack, and the body, built by the Western Auto Body Company, of Los Angeles, is designed to hold 50 passengers. The manager of the hotel states that the only drawback to the machine is that there is not room for everybody on the top deck.

Fort Dodge, Ia.—A motor bus stock company is being organized here.

* * *

Alexandria, Ky.—G. S. Phillips has bought a 2-ton motor bus.

* * *

Boston, Mass.—The New York and Boston Autobus Company, of Chelsea, has been incorporated with a capital of $20,000, by Daniel O. Fillmore (Chelsea), Chas. E. S. Moir (Boston) and B. F. Borhek (35 Congress street, Boston).

Nahant, Mass.—Nahant does not propose to have a motor bus line connecting that town with Lynn this summer, if its officials can help it. Recently the Lynn council, despite protests from Nahant, granted licenses for a motor bus line to Nahant. The Nahant selectmen, however, have given notice that anyone who is discovered soliciting fares for a motor bus in that town will be brought before the police court. The motor bus men, it is said, propose to test the right of the Nahant selectmen thus to bar them.

Worcester, Mass.—George H. Prouty, of Barre, has bought a 12-passenger motor bus for transfer work in the Barre district.

* * *

Detroit, Mich.—The parks and boulevard commissioners have bought three more 29-passenger motor buses, at $5,160 each. One must be delivered by July 1, and the other two on July 20.

* * *

Minneapolis, Minn.—F. C. Warner of the Girling-Warner Company, Minneapolis, who has been operating the Anoka bus lines, comprising five machines, for the past year, has just installed an interurban bus line between Eveleth and Virginia, with a 27-passenger motor bus. It will operate in competition with the liverymen who are now carrying trade between these two points, a distance of nearly 4½ miles. Mr. Warner is enthusiastic over the new line and will place more vehicles at that point in the near future. The route from Minneapolis to Hanover was opened May 20, leaving opposite the Radisson hotel at 4 o'clock and returning at 10 o'clock the next day. Stops are made at Robbinsdale, Osseo, Maple Grove, Champlain, Hanover, Hassen and St. Michaels.

Chillicothe, Mo.—The Ishmael & Allen Bus and Transfer Company has installed a motor bus to haul passengers between the hotels and depots.

St. Louis, Mo.—City officials, who want a motor bus line established in Forest Park to the Art Museum, are somewhat surprised at the demands of those who are seeking the privilege. They expected that motor bus owners would agree to run machines at specified periods on Sundays for a fare of 10 cents and would pay the city a small compensation for the concession. Only two bids were received. The Mack Motor Truck Company offered to furnish the buses according to the rules if the city would pay it $16,000 for the two years of the contract. The Seeing-St. Louis Automobile Company agreed to establish the motor bus line if the city would give it a guarantee that the fares would amount to $35 daily. President Reber of the Board of Public Improvements said in a recent interview that the bid of the Seeing-St. Louis Company probably will be accepted if it is recommended by Park Commissioner Davis. He said that the contract would be terminated at the pleasure of the board, and that if the loss is great the board would immediately rescind the contract. Davis and Reber say that they believe the public desires and will use a motor bus line rather than climb Art Hill to the museum. If the line is established the machines will run only on Sundays during the experimental stage. The route will be from the Lindell entrance to the Union and De Baliviere entrances, thence to the bird cage and zoo and up the hill to the museum. If the line proves a success it will be extended to week days.

* * *

Fallon, Nev.—Two motor buses have been installed by Mr. Benadum.

Sierraville, Nev.—Ed Dolly has established a motor bus and freight line between this place and Reno.

* * *

Hastings, N. Y.—On or about July 1, the Post Road Transportation Co. will have 11 motor buses in service between this city and Ossining. The company will employ 50 men and has been capitalized at $100,000. The route has been laid out in five zones, from Hastings to Dobbs Ferry, Dobbs Ferry to Irvington, Irvington to Pennybridge, Pennybridge to Aqueduct bridge, Aqueduct bridge to Ossining. A 5-cent fare will be charged over each zone, or 25 cents for the total distance of a little over 12 miles. In addition, branch routes from Dobbs Ferry to Ardsley Heights, Irvington to East Irvington and Elmsford and Tarrytown to Philipse Manor, also are being considered. It is planned to maintain a 15-minute headway with 50-minute running time for the Hastings-Ossining trip. Further extensions also are in prospect. Headquarters are maintained at Tarrytown.

Ovid, N. Y.—The motor bus line between Seneca Falls and Ithaca has resumed service on its regular trips.

Watertown, N. Y.—The Watertown Transportation Company has bought another motor bus and is planning further extensions of the service.

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Cincinnati, Ohio.—The Cincinnati Advertisers' Sightseeing Auto Company plans to start street service on June 1.

Youngstown, Ohio.—The Poland Transit Company has been organized with a capital of $3,000 to institute motor bus and freight service. The incorporators are W. F. Leedy, Frank H. Shilling, F. Mason Wick, I. C. Shilling and R. C. Randle.

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Collegeville, Pa.—A motor bus service between this place and East Greenville has been established.

Reading, Pa.—A motor bus line between Boyertown and Red Hill, Montgomery county, operated by the Perkiomen Transportation Company, is being liberally patronized.

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Paris, Tenn.—The Paris Transfer Company will institute motor bus service to and from the railroad depots.

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Burlington, Vt.—The New Sherwood House has installed a 16-passenger motor bus, the first motor hotel bus in the state.

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Seattle, Wash.—A motor bus has been put in service at Sol Due Hot Springs.

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Sheboygan, Wis.—A company is being organized here to operate a motor transportation service for passengers and freight between Sheboygan and important cities and villages in Sheboygan county. The company intends to purchase two buses for passenger service and two motor trucks for freight use.

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Montreal, Can.—According to plans of the Canadian Autobus Co., as made known to the Montreal Board of Controls, the company will carry 50,000,000 passengers a year, or 42 per cent of the number carried by the Montreal Tramways Co. in its street car service. The new company proposes to use $5,000,000 of its $10,000,000 capital stock for the Montreal service and the balance for services to be established in other cities. The proposed city by-laws pertaining to motor buses require that conductors be able to speak both French and English, and limit the speed to 9 miles an hour (4 miles an hour at crossings) and the number of working hours of the men to 48 a week and 8 a day. Fares will be 5 cents, with transfer privileges.

Toronto, Can.—Julius A. Halford's proposed motor bus system has been hampered by the strikes in England. Shipments of machines will be made soon. Fifty double-deckers will be used at first.

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Palmerston North, New Zealand.—A $50,000 motor bus operating company is being formed here.

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Berlin, Germany.—The government of Würtenburg is acquiring, by gradual purchase, all motor bus lines in the state.

NEW BLOOD IN TRANSPORTATION.

The power wagon is the new blood in the veins of mercantile transportation, according to Alfred E. Holmes, superintendent of buildings and machinery for Alexander H. Revell & Co., the Chicago furniture dealers. "Every mercantile firm of importance in the country," he says, "knows this from experience. The power wagon didn't spring up like a mushroom during the night. It took years of plugging to make it look as good on the street as it looked on paper. Now it is as reliable as the horse ever was, and a better investment calculating from every angle.

"When I first installed the power wagon I used to spend hours making totals and minute comparisons. Then I awoke to the fact that the power wagon was stupendously superior to the horse in hauling goods, and that the superior merit was something more than a matter of figures. It was a matter of satisfaction—not only to ourselves, which was well enough, but to our customers, which was better.

"Revell & Co. used to employ 60 horses before they had any power wagons. Now the company has four power wagons and uses only 20 horses. These figures are as significant as they appear. Not only that, but with the advent of the power wagon we have been able to make deliveries such as we never thought of before.

"The power wagon travels into the farming country and comes back again the same day. It is ready for use the next day. A team of horses bearing goods would be incapacitated for one or two days after a similar journey. We now can make deliveries to Wayne, Ill., 38 miles from Chicago. And we reach into the suburbs on the north and west sides. Before the power wagon came a customer not living in the city would have to wait several days for goods. We used to deliver only on certain days and at intervals of about a week.

"Today, if you live in the suburbs and come here to make your purchases, you will find the goods waiting for you when you return home.

"The 20 horses we still employ are used for one purpose—waiting at the depots. There is one thing a power wagon can not do economically, and that is to wait. Every time a power wagon hesitates a figure or two falls from the right side of the ledger. Power wagons must keep moving. The more they move and the faster they move, the more 'superior merit' they roll up for themselves.

"The merchant who makes use of the power wagon finds one problem eliminated. He doesn't have to worry about the humane side of it. There is no danger of overworking the power wagon as there is in the case of the horse. And if the power wagon shies, foams at the mouth and exhibits other symptoms of distress, it is merely a matter of mechanics or carpentry—the same as repairing a rocking chair.

"We overhaul our power wagons about once a year. This is often enough unless collisions and unavoidable breakdowns occur. I figure the depreciation at about 20 per cent a year. That gives one of them five years to keep moving. After the five years are up, the additional service contributed by that power wagon is figured as clear gain."

TRACKLESS TROLLEY COSTS.

Figures regarding the costs of the trackless trolleys in Leeds and Bradford, England, are now available. In both cities the machines cost $3,500 each. The overhead equipment in Leeds cost $6,230 a mile, including other capital outlay in connection with the installation. The cost in Bradford was $8,670 a mile. Excluding interest and depreciation, the total operating costs in each town are 11 cents per car mile. The average revenue in Leeds amounts to 17.5 cents a car mile.

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Wheel Alinement.

Mal-alinement of Wheels Is a Fruitful Source of Trouble and Expense.

SIMULTANEOUSLY in this country and in England there has arisen a discussion on the effect of wheel alinement on the wear of tires. A well known American pleasure car authority states that most makers (of pleasure cars) arrange to have the front wheels "toe in," from a quarter to half an inch, in order, it is claimed, to make steering easier. It is further stated by the same authority that the admitted extra wear on the tires caused by this want of alinement is comparatively insignificant.

A prominent English motor wagon journal, dealing with the same question in the case of power wagons, takes the matter very seriously, and states that nearly 50 per cent of the complaints regarding poor life of tires are due to want of proper alinement of the wheels.

An English manufacturer of pneumatic tires for pleasure cars made the assertion some time ago that mal-alinement of wheels has the effect of reducing tire life by at least 90 per cent, so it would appear that at least in the heavier makes of pleasure cars and in practically all of the motor wagons the question of proper alinement of wheels is of considerable importance.

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Typical Case Considered in Real Figures.

A concrete example will make this clear. Let us take the case of a 3 ton motor wagon weighing, with its load, 12,000 pounds. The particular model we have in mind, selected quite at random from the "Power Wagon's" specification tables for 1912, carries 65 per cent of its weight, when fully loaded, on its rear wheels. The normal road speed is 12 miles an hour. The rear tire equipment is 34 by 4 inches, dual. We are going to assume that one of the rear wheels is 1 inch out of alinement, and that the machine is on the road for 5 hours a day, making a daily mileage of 60 miles.

In this particular case, that mal-alined wheel would skid 1 inch on its whole circumference, for each complete turn. In 60 miles the wheel makes over 32,600 complete turns, and would therefore skid that many inches around the whole circumference. Every particle of the tire tread would skid a number of inches represented by the quotient obtained by dividing 32,600 inches by a number which is the quotient of the whole circumferenec of the tire divided by the average amount of full-pressure contact of the tire with the ground. Here we have to make an assumption, which may alter the result as much as 25 per cent one way or the other, but this is not sufficient to make an appreciable difference in the point we are trying to establish. Suppose, then, that the average full-pressure contact is 4 inches. This is about one twenty-seventh of the total circumference, and that fraction of 32,000 inches is about 1,200 inches in round figures, or 100 feet.

This means that every particle of the surface of the rubber in that mal-alined tire is dragged sideways over a rough pavement no less than 100 feet in the course of the day. Now as that tire has to support 3,900 pounds (one-half of 65 per cent of 12,000 pounds) of the gross load of the motor wagon, it will be apparent to the veriest novice that it must have suffered considerable injury in the process. And this rubbing action has been done at the rate of about one-ninth of a mile an hour—which can easily be verified by dividing 12 miles an hour by a number representing the quotient of the whole circumference (in inches) divided by one inch (the slip in one revolution). Is it any wonder, then, that a tire which is guaranteed for 8,000 or 10,000 miles, and which, under ideal conditions, should give 25,000 or 30,000 miles, often wears out after only 2,000 miles when operating under such conditions. Truly the tire manufacturer does not always lie on a bed of roses!

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Causes of Mal-alinement of Wheels.

Having thus established mathematically the fact that mal-alinement of wheels does cause abnormal tire wear, it becomes necessary to see what measures should be taken to prevent this abuse. We cannot do better than quote our English contemporary, "Motor Traction," on this:

Some of the chief causes of the wheels becoming out of parallel, says "Motor Traction," are violent contact with the curb, or negligently running over some prominent obstruction in the road. Undue "play" of the wheels on the axles and the various steering joints is also largely responsible, and wherever there is undue amount of "play," steps should be immediately taken to remedy the defect, otherwise irreparable damage to the tires is inevitable. "Play" in the steering connections is the chief cause of flats wearing around the tread of the tire, as, owing to the constantly alternating direction and unevenness of the running, and the twisting effect at the point of contact with the ground, considerable unequal wear is set up. When loose steering joints exist with mal-alinement, the uneven running is more pronounced, and more serious damage to the tires is of frequent occurrence.

Irregularities in the driving wheels of a motor vehicle do not exist to the extent that is the case with front wheels, though it occasionally occurs when the back axles are displaced to one side or the other, thus causing the wheels to take up a diagonal position with a consequent grinding action upon the tires. It is essential, should it be discovered that the back wheels are out of parallel, that the fault be rectified immediately if the full life of the tires is to be obtained.

* * *

Simple Test for Mal-alinement.

In the majority of operating engineers' shops running large fleets of vehicles, apparatus is installed for constantly testing wheels for alinement, but for those of our readers who have only one, or perhaps two vehicles in use, an extremely simple method of testing can

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be adopted. All that is required are two stiff wood battens which should be about 1½ inches to 2 inches square, and about 8 feet 6 inches long. In the ends of these battens small holes should be drilled and two equal lengths of strong twine inserted therein. Care should be taken to make the holes in the wood equi-distant, and the ends of the twine on being passed through the holes should be knotted or secured in a suitable manner, so that there is no variation in the lengths of twine. The wood battens should then be placed over the backs of two chairs or other suitable rests, so that the lines of twine are adjustable in a straight line along each side of the vehicle. The front wheels should then be jacked up clear of the ground, and the battens adjusted so that the twine on one side is dead straight and equi-distant from the edges of the flanges or rims of the front and back wheels. As there is sometimes a difference in the width of the track of the back and front wheels, the actual distance of twine from each wheel may be the same; but this is of no great consequence so long as the same difference exists on the opposite side. It is of the greatest importance, however, that special precaution should be taken to see that no difference exists on the distance fore and aft of the diameter of each particular wheel. Having made this adjustment, measurements should be taken of the corresponding positions of the wheels on the opposite side, and should there be any variation, it is evident that the wheels are not parallel and require attention.

The chief irregularity discovered in this test will probably be that one of the front wheels is out of alinement. In order to correct this fault, the connecting rod should be lengthened or shortened, according to whether it is in front or behind the axle. The connecting rod is generally provided with an adjustment sleeve with right and left hand threads, and by means of this the malalinement of the wheels can be rectified in a very few moments. Should this sleeve, however, not exist, it will be necessary to shorten or lengthen the rod, to do which the aid of a smith is required. As, however, the cost of an adjustment sleeve is extremely reasonable, it is recommended that steering connection rods should be so equipped at the earliest convenience.

The wheels should be adjusted so as to prove parallel when they are thrust outwards in front as far as any slight play in the steering points will permit, as the forward movement of the car along the road always tends to keep them in that position.

Should it be found that the rear wheels are not parallel, it can be put down to a bent axle—the result of a violent collision with another vehicle, the curb or some road obstruction. This is a more difficult matter than setting the front wheels, and the axle must be removed and placed in skillful hands.

Another difficulty sometimes discovered is that usually caused by displacement or unequal adjustment of the radius rod. It is quickly discovered by setting the front wheels parallel with the chassis, and then measuring the distances between the ends of the axles and the string. These distances should be alike in both cases.

A serious form of displacement of the driving wheels which should be avoided is that in which the rear wheels are at unequal distances from the frame of the chassis.

In view of the importance of this matter, continues "Motor Traction," we have taken the opportunity of testing many vehicles for wheel alinement, and to such an extent do these irregularities exist that we would urge all users to make it a rule and regulation that their vehicles be tested at least once a week for any defect in this direction.

An examination each day is desirable, but general tests for alinement should not be neglected for more than a week, and it is a very good rule to test front wheels on the first day of each week, and to make a more general test for back and front alinement at least once per month.

TESTIMONIAL TO CLARKSON.

In appreciation of the splendid work of Coker F. Clarkson, secretary of the S. A. E., the Indiana Section has started a fund to present him with a motor car. George A. Weidely, treasurer, Indiana Section S. A. E., 3305 Central Avenue, Indianapolis, is collecting checks from far and near, and the funds will be turned over to a committee composed of the chairman of the Metropolitan, Philadelphia and Detroit sections.

MOTOR MAIL IN PHILADELPHIA.

Formerly it required 20 wagons and 40 men to collect mail in Philadelphia city over the same routes that the collection is now handled by 5 motor wagons and 10 men. On each car is a driver, who has no connection with the Government service, and a regular Government mail carrier. Four of these five cars have been running since the Fall of 1909.

Under the contract the Autocar Company, for a set rental per year, not only furnishes the cars and the operator for each, but also agrees to be subject to a fine if, for any reason, the cars are unable to maintain their prescribed schedule. The average distance covered in each day of 8 hours is 65 miles.

LESS DEMAND FOR HAY.

According to the leading dealers of Portland, Ore., the hay market is being badly affected by the greater number of motor wagons being utilized by various business houses. The invasion of the gasoline machine in the delivery trade is said to have cut the demand for horse feed exactly in two within the period of a single year. To some extent the oats market has been affected by the same cause.

A motor wagon has been installed in the (water) meter department of Spokane, Wash.

Saskatoon, a town in western Canada, has adopted motor wagons even though it has no paved streets.

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Ideal Fire Apparatus.

Some Practical Suggestions From an Experienced Fire Chief.

By J. F. RUNYAN.*

THE FIRE CHIEF of today points with pride to his apparatus and his record of small fire loss rather than to the appearance of his men and himself on parade day.

In the last three years the ideal fire apparatus for volunteer departments has come into service, that is, the motor apparatus. The upkeep of motor apparatus is practically nothing, it is ready for instant service at all times, no horses have to be hooked up, no horses are eating their heads off between runs, but your machine is ready for service any minute (if the proper care is given it) and is capable of giving far more efficient service than any horse drawn apparatus that was ever built.

In the Morristown department, of which I had the honor to be chief for four years, we have had a motor apparatus in service for over two years. During that time it has never failed to respond to an alarm on the instant. We have used it in good weather and bad, on the roads good, bad and indifferent, at times when the dust was so thick that you could scarcely see and sometimes when the mud was so slippery and heavy that the streets were practically impassible for horse drawn apparatus. We have used it when the streets were covered with ice, when horses were slipping, sliding and falling and at other times in snow that was two feet on the level and have encountered drifts successfully that were from four to six feet in depth. At no time has the apparatus failed us and in the deep snow mentioned it responded quickly and, the fire proving to be some size, we used it as a road breaker for the horse drawn apparatus. To be sure it is one of the best ever turned out to my knowledge. It has an engine that developes some 60 horsepower and more speed than we care to use, and the motor part of it is one of the best pieces of machinery that this country can turn out. We have answered not only local alarms but have also given help to surrounding towns within a radius of 18 miles and in two instances that I now think of we were on the ground in towns four miles distant before the local apparatus had got to work.

Were I to be turned loose and given the money and authority to equip a volunteer department for a town of, say, 12,000 inhabitants, with what was in my opinion the best fire apparatus, I should install motor apparatus as far as possible.

There are comparatively few towns that have a normal water pressure at their fire plugs of less than 30 pounds. Supposing this to be the case my first piece of apparatus would be a motor chemical engine carrying 35-gallon tanks together with 1,000 feet of 2½-inch hose to be used as a first or still alarm apparatus. My experience has been that two 35-gallon tanks are far preferable to one 50-gallon tank for the reason that in many cases one 35-gallon tank is amply sufficient and that being the case leaves a reserve tank ready for immediate use for a second call, which has happened a number of times in my department, before the discharged tank could be refilled. The hose carried will be of great use when it is found that the fire has been underestimated and the department should have been called instead of the chemical engine. I should also have on this piece of apparatus two 3-gallon extinguishers, a 24-foot extension ladder, axes, hooks, plaster hooks, crowbars and door openers.

My next piece of apparatus would be a motor pumping engine of 500 to 700 gallons capacity and carrying 1,000 feet of 2½-inch hose. This apparatus should also be equipped with axes, hooks and small extinguishers. My truck would be a motor apparatus and should be equipped with ladders up to 55 feet in length together with hooks, crowbars, battering rams and such other equipment as is usually carried on the hook and ladder truck. I am still undecided as to whether my fourth company should be equipped with a motor engine or with the old standby, the steamer and tender. I have a feeling in my heart that I should feel a little more confident in the efficiency of my department had I a good substantial steam fire engine to fall back on in case of a conflagration rather than pin my faith wholly on the new invention. My personal experience has had to do only with the steam fire engine and the motor chemical although we are now having built a motor truck. The motor chemical we have had in service over two years and with it we have handled more than 80 per cent of our fires.

Our department is equipped with the Gamewell Fire Alarm system and the company operating the motor chemical has in its employ a driver who is constantly on duty and who also acts as janitor of the house. Our truck is a horse drawn apparatus and the company owns the horses which pull the truck. They are stabled in the house and a driver is constantly on duty. The same is true of one of our engine companies. We have three other companies in our department for which we have to hire horses for their service. The first three companies named, however, are giving as efficient service as does any paid department, while operating at minimum expense.

Extinguishing fires being so much of a business proposition, every town should do its utmost to provide proper equipment for its department in order that the best results may be obtained. To get these results quick service must be had. One of the first essentials for quick service is an automatic fire alarm, this be-

*From a paper—"The Equipment and Efficiency of the Volunteer Fire Service"—read before the last annual convention of the International Association of Fire Engineers. Mr. Runyan was formerly fire chief of Morristown, N. J.

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ing installed the next most important step is that of having men on duty at all times or within quick calling distance. The chemical engine should have a man constantly on duty and a telephone should be installed in each engine house as an auxiliary to the fire alarm. It will be found upon comparison that the motor apparatus and a man constantly on duty can be maintained at about the same cost per year as could a horse drawn apparatus with a man on call. Quick response is most necessary in case of fire, the first 15 seconds are the most valuable in the saving of life and property and every effort should be put forth toward attaining this end and the saving of a few dollars in the equipment of your department often proves to be the most expensive in the end. While the modern equipment is most essential to the efficient fighting of fires in the volunteer department as well as the paid department the thing most important above all others is discipline. No chief engineer can expect to accomplish good work at a fire, no matter how well his department may be equipped with apparatus, no matter how much he may know himself as to what should be done, unless he has his men well disciplined. He may himself be the best fireman in the world, singlehanded he can do nothing, he must have his men so well trained and so well disciplined that they will instantly respond to any order he may give. While he should be fearless and eager to lead his men into the hottest and most dangerous spot of the conflagration he should be of such caliber that he can stand far enough away at times from the fire to take in the situation in its entirety that he may be able to comprehend completely that with which he has to compete. The chief engineer who has six men under good discipline can do more with six buckets and a brook than can a chief who has the most modern equipment whose companies are at loggerheads with each other and anxious to shine individually.

PROPOSED TAXI LAW IN ST. PAUL.

The city sealer and the corporation attorney of St. Paul, Minn., have under consideration an ordinance to regulate charges by taxicab companies and requiring the inspection of taximeters.

According to the outline in the city sealer's office, the plan is to test the meter on each taxi by removing it from the cab and connecting it with a machine, which would have to be purchased for that purpose. An indicator on the testing machine records the fare and the meter would have to show the same fare in order to pass inspection. The idea then is to place it on the machine and take the measurements of the wheels and tires of the taxi. Each meter is made to record fare for a certain sized wheel, and should the tire or wheel be smaller than is supposed to be used on the meter, the sealer declares the user of the cab is paying for something he does not get. It is the city sealer's idea to ride the car over a given course, and should the meter show the correct fare, record his approval together with the measurements, and seal with a lead seal so that it could not be tampered with.

Another clause of the proposed ordinance will be the privilege of passengers to refuse to pay for any part of a ride should the taxi break down before destination is reached. "It is an injustice on the public to hire a taxi and when half way to destination be compelled to wait for the fixing of a breakdown," said the sealer. "By making it possible for passengers to refuse to pay any fare at all for such a trip taxicab companies will see to it that the cars are in good repair and the efficiency of the service will be improved. Of course, should they wait until the cab is repaired and continue the journey they must then pay for the trip."

WORM GEAR DEVELOPMENTS.

"Until recently there appear to have been no figures available giving the relations between the size of gear, the efficiency, the load transmitted and the temperature increase," says Dr. W. R. Ormandy in an article in the Manchester "Guardian," discussing the recent North England Motor Show in that city, "but recently a comprehensive series of experiments has been carried out, taking into account the radiating surface from gear casing of various sizes, and it is now possible to get for worm gears similar guarantees to those commonly asked for in dynamos and motors.

"As a result of these experiments it is claimed that the smaller gear can be used with the addition of a cooling device in the form of an air-cooled radiator, through which the lubricant is pumped by means of a small centrifugal pump placed on the worm shaft. The oil is taken from the bottom of the casing and delivered cooled in a constant stream to the worm wheel. With this device the makers claim that it is possible to transmit large powers through gears which would otherwise be far too small for their work. Further, that comparatively cheap high-speed electric motors with small but efficient worm gears can be used for transmitting fairly high powers at prices which would previously have been impossible. Recent progress in the construction of worm gears has led to the application of the worm and wheel principle even for high speeds, a thing which a few years ago would have been regarded as quite out of the question."

FIRST MOTOR FIRE ENGINE FOR CHILE.

The first motor fire engine for Chile arrived from France the first of the year for the fifth fire brigade at Santiago. It weighs 5,750 pounds, and has a speed of 27 miles per hour on the level. The engine is 120 horsepower and is capable of throwing a 1 inch stream a distance of 220 feet.

Motor fire engines equipped with high-pressure turbine pumps are increasing in favor in Germany.

The German army will use 50-passenger motor buses on an extensive scale during its maneuvers this year.

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Advertising Literature.

The Modern Tendency Is to Appeal to the Business Instinct of a Prospective Buyer.

MOTOR WAGON advertising literature has advanced in tone, quality and business interest during the last few years. Formerly the average catalog consisted of a mass of glittering generalities, more or less unsubstantiated claims and exaggerations, pictures of intricate looking mechanical parts tended to scare the average layman from contemplating purchase, and a long list of dry-as-dust specifications intelligent only to the most experienced mechanical expert.

The literature now being put out by the better class of power wagon companies is on an entirely different plane. Instead of confounding the "man in the street" by a mass of technicalities which he cannot understand, a direct appeal is made to his business instinct. Facts and figures are presented in an interesting and comprehensible way, and an effort is made to show how machine delivery service will prove advantageous and economical under a wide variety of business conditions. Pictures are included only when they show something in business application. Unnecessary technicalities are rigorously excluded, and commonsense arguments are substituted for academic and unprofitable discussion which appeals only to the small minority.

One of the best pieces of motor wagon advertising literature that has recently been issued is a pamphlet entitled "The Electric Truck as an Investment," put out by the General Vehicle Company, of Long Island City, N. Y. While this brochure is intended to promote the cause of the electric truck in general and that of the General Vehicle Company in particular, it is a good example of the spirit in which power wagon manufacturers are meeting the receptive attitude of business men who are seeking enlightenment on the solution of their road transportation problems.

The following abstracts from this 16-page pamphlet will furnish confirmation of this welcome change in modern publicity methods as applied to the motor wagon industry.

The record of a railroad must inspire confidence or its bonds bring no premium.

The record of a motor truck must also be above reproach or it will not warrant the business man investing his money in it.

The G. V. electric truck has a splendid record not only for efficiency but for low maintenance and long life.

G. V. electrics are earning splendid dividends for hundreds of our customers. Thousands have confidence in our product—that's why we get the business.

* * *

The Motor Truck Misunderstood.

The motor truck is still misunderstood by thousands of this country's bright business men. They have mistaken ideas about its purpose, its field and the scope of that field. Some of them wholly ignore it, others regard it as a reconstructed pleasure car—a rebuilt automobile adapted to business needs. Even some of those who recognize its ultimate place in the world's progress regard it as still in the experimental stage.

This, while unfortunate, is to be expected of a machine destined to revolutionize methods of transporting merchandise. The horse has been with us so long that many believe he will never be supplanted to any great extent or a more efficient substitute found for him.

* * *

The Electric Truck Vindicated.

It must be conceded that when hundreds of the largest firms in the country officially adopt the electric truck for their city delivery service they must consider it perfected at least to the extent of being superior to horses and more economical than non-electric trucks for their work. Three express companies have to date purchased no less than 361 electric trucks, three brewers 171, three packers 99, three delivery contractors 93, and three department stores no less than 157.

* * *

Progressive Methods in Purchasing Electrics.

It may be of interest to learn just how some of the early buyers of electric trucks ascertained beyond all question the relative value of electric and horse wagon deliveries, and the principle involved can best be illustrated by citing the cases of two firms who have been large purchasers of the electric trucks made by the General Vehicle Company. One of these is a nationally known express company and the other a brewer.

The American Express Company purchased as follows:

Date	Number	Capacity
1907	2	2-ton
1908	1	2,000-pound
1908	1	2-ton
1911	25	2-ton
1911	2	3½-ton
1912	22	2-ton
1912	9	3½-ton

Total G. V. electrics purchased to date, 62.

The American Express Company now uses about 110 electric trucks and will soon order 100 more. The company uses electrics for pick-up work and short deliveries, and gasoline trucks for long transfers where greater speed is desired.

Jacob Ruppert, the brewer, purchased as follows:

Date	Number	Capacity
1903	4	5-ton
1907	3	3½-ton
1911	35	5-ton
1911	4	2-ton
1911	2	1-ton
1912	10	5-ton
1912	12	5-ton
1912	2	3½-ton

Total G. V. electrics purchased to date, 72.

* * *

Moral for 1912 Buyers.

In the purchase of electric trucks it is not now necessary for you to proceed on the basis which pioneer purchasers did, for the reason that their experience obviates the necessity for your experimenting with an electric over a period of years to see if it will make good. It is a known fact that the high-grade electric, within the range of its operation, is economical as compared to other methods of transportation; accordingly it would be false economy for you to wait to determine the amount of the economy to the last fraction of a cent before securing the benefits. Isn't this true?

Just turn if you please to page 2 and study the illustrations headed "The G. V. Power Plant." Look at the simplicity of construction! No reciprocating parts, no gears, no clutches. One rotating part and that the time-tested, clean and practically silent electric motor. Here are some other interesting points:

Economy of Investment: Scores of G. V. electrics of our earliest designs—from six to ten years old—are still in successful

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daily operation. You need only figure depreciation on G. V. trucks at 10 per cent!

Economy over Horses: 100 per cent. faster than horses, 25 per cent. to 60 per cent. cheaper than horses, 75 per cent. less space required. No noise, no dirt, no odor.

Economy of Upkeep: Fewest wearing parts of any motor wagon. All six models *standardized;* all parts *interchangeable;* complete roller and ball-bearing equipment.

Economy of Tires: Easy starting, smooth application of power and even acceleration of speed reduce tire wear to a minimum

* * *

The Saving on Drivers.

The fact that in changing from horses to electric trucks you can utilize your regular horse drivers does much to simplify the problem of the man who wishes to retain his old drivers, many of whom possess a valuable knowledge of the firm's routes and methods of delivery. We do not exaggerate when we say that with 48 hours' instruction by a competent demonstrator, the average teamster can successfully operate a 5-ton electric truck. That is, he will be able to take it around corners without taking the lamp-post with him, back it into alleys or doorways, go down grade at a safe pace, and so on. In a few days he is absolute master of it. Again, most drivers are not only willing, but anxious to drive the electric. With a man's natural love, or at least interest in things mechanical, they are keen to see for themselves just what this silent, self-propelled vehicle will do.

Nearly $2,000,000 worth of electric trucks are now driven by ex-brewery teamsters, who certainly are neither expert machinists nor chauffeurs. They go out in most cases alone with a full load, and rarely fail to keep their truck in good working condition. Accidents with them are very unusual, and collisions practically nil. They are generally paid about $2.00 per week more than horse drivers, and are content to get this difference. The same is true of drivers of express and department store electrics, some of whom get the same pay as horse drivers.

* * *

Still Other Possibilities in Economy.

There are still many other possibilities of economy in adopting the electric truck, and one of these is the saving in ground rents, made possible by the smaller housing space required for the electric as compared with the corresponding quota of horses and wagons. Here is but one example:

In 1906, Peter Doelger, a prominent New York brewer, had 120 horses, a stable, 200 feet street frontage by 100 feet deep, no less than three wagon yards, a blacksmith shop, and other horse delivery equipment, all adjoining his brewery on East 55th street, New York, which in these days is well "down town." In 1909, he purchased his second 5-ton G. V. truck, and later in the same year six more. In 1910, he ordered 18 more G. V.'s. In 1911, he was operating 30, and these 30 G. V. trucks are what save him, on the testimony of his own superintendent, $25,000 a year.

By July, 1912, this brewer will be operating 52 electric trucks and no horses whatever, as they are all to be sold by April 15. Half of his former stable has been torn down, and a handsome building, three stories high, erected on the space thus secured, this building being devoted to a bottling plant and shipping room. On the ground formerly devoted to one of his wagon yards, he has built a fine garage, 85 feet by 100 feet, two stories high, with a capacity of 48 trucks, or 24 to each floor, and he will shortly add two more stories, thus enabling him to accommodate 96 electric trucks.

With real estate values what they are in New York (or any large city), it is not difficult to see how the saving in ground rents, added to a substantial saving on each truck over a corresponding horse delivery system, may shortly bring his annual saving close to $50,000. Mr. Doelger will soon have available the ground formerly devoted to two wagon yards and half of his stable, or a combined area equal to at least 10 city lots. He thus has room to extend his plant at any time this becomes necessary, or to dispose of his holdings if desired. He has an up-to-date bottling and shipping plant, a delivery service second to none, and an income on his investment in electric trucks equivalent to 5 per cent. on $1,000,000.

* * *

Thousands of G. V. trucks and wagons are in daily use throughout this country, the Philippines, Canada and South America. For short-haul, frequent-stop work they have no equal. We can tell you just what it will cost you to operate—under given conditions—one G. V. truck or a fleet of 25, and, what is more, we will give you a strong maintenance guarantee for your protection.

We want to see you get the truck which is best for you, whether it is a G. V. or some other make. We are in business to stay and would rather lose the order than to sell you a G. V. truck not adapted to your particular work. Isn't it wiser to get in touch with the manufacturer whose selling policy comprehends frank dealing and real co-operation with the prospective purchaser, when there is so much at stake?

We build a complete line of six standardized models of the following capacities: 750 lbs., 1,000 lbs., 2,000 lbs., 2 tons, 3½ tons and 5 tons.

Each of these models is best adapted to certain kinds of deliveries. When we know what your transportation problem is we will recommend the model or models best adapted to your work. Large department stores, for example, frequently use three models—the 5-ton G. V. for heavy trucking, warehouse to store, etc.; the 3½-ton (or 2-ton) G. V. for transfers to distributing points, and our 1,000-lb. wagons for deliveries proper. Brewers use principally the 3½- and 5-ton models, as do manufacturers and wholesalers. Retail grocers and other small merchants naturally use the lighter wagons almost exclusively.

Think of the information we have available as to actual costs of operation in all lines of trade! We have been gathering it for eleven years. We know from actual experience just what capacities are adapted for certain work—the strong points and the limitations of all our machines. This information is at your service.

BUYING FUEL BY COUPONS.

According to "Motor," a British publication, the German gasoline companies have instituted an excellent system which might with advantage be copied elsewhere. Under this new arrangement the motorist can go to headquarters and purchase a book of coupons exchangeable at any gasoline depot. The manifest advantage of this is that the motorist always knows exactly what his fuel costs, there can be no dispute as to what is the legitimate cost in the district in which he happens to be, and it vastly simplifies the keeping of his car accounts.

MOTOR BUSES FOR ARMY SERVICE.

A motor livery service concern in Loveland, Colo., has offered to inaugurate and maintain a motor bus service between Cheyenne and Fort Russell for the officers and enlisted men who months ago boycotted the electric street railway. The machines wil have a carrying capacity of 12 persons each, and the service will be put on in a few days. The round trip fare will be 20 cents. It is understood this service will be satisfactory to the enlisted men, and that sufficient patronage will be obtained to maintain the service indefinitely.

Hailey, Idaho, has motor mail service.

The German government has placed an order for wireless-equipped motor wagons for army use.

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N. A. A. M. Adopts Standards.

Some Business-like Propositions by the Manufacturers' Association.

AT THE REGULAR monthly meeting of the Executive Committee of the N. A. A. M. on May 1, several recommendations made by the Commercial Vehicle Committee were adopted unanimously by resolution.

* * *

Standard Charges for Demonstrations.

The troublesome question of demonstrations was dealt with by passage of the following resolution:

RESOLVED, that the Executive Committee recommends to all the members of the Association that no member of the Association shall demonstrate a commercial car or automobile which such member has for sale, to a prospective purchaser or customer, unless such member makes a charge and receives in payment for such demonstration the following prices only, to-wit:

½ and 1-ton trucks, $10 a day.
2-ton trucks, $15 a day.
3-ton trucks, $20 a day.
4-ton trucks, $25 a day.
5 and 6-ton trucks, $30 a day.
7 and 8-ton trucks, $35 a day.
9 and 10-ton trucks, $40 a day.

* * *

Standard Frame Widths.

With a view to providing for future interchangeability of bodies on trucks of different makes, the Executive Committee adopted a resolution recommended by the Commercial Vehicle Committee establishing two standard widths of frame back of seat for motor trucks—namely 36 inches and 42 inches—and frame lengths back of seat graduated by feet and half feet from 4 feet to 18 feet.

General adherence to these frame dimensions will permit stock bodies that will fit any make of truck to be built in quantity and delivered without delay, and will also make it possible for the user to transfer a body of any type from a chassis that may be temporarily out of commission, to one of another make.

The desirability of such standard dimensions was shown by a report that measurements of 88 different models produced by various manufacturers revealed nineteen different frame widths, from 28 inches to 46 inches, and that upward of 100 models showed 41 different lengths of frame back of seat, from 48 inches to 218 inches. It was found that by graduating the lengths by feet and half feet, from 4 to 18 feet, more than half of these could be eliminated.

* * *

Registration Fees for Motor Wagons.

With a view to forestalling impending legislation in several states that would place unreasonable restrictions on motor wagons and increase the license fees, basing them on horsepower instead of load capacity, a resolution was passed directing counsel to prepare a registration bill for motor trucks to be introduced in the New York and Massachusetts legislatures in which registration fees shall be based on the factory rated useful load capacity, about as follows:

For 1-ton, $5.00; 2-ton, $7.50; 3-ton, $10.00; 4-ton, $12.50; 5-ton, $15.00; 6-ton, $17.50; 7-ton, $20.00; 8-ton, $22.50; 9-ton, $25.00; 10-ton, $27.50; over 10-ton, $50.00.

Fees for trailers to be one-half those for trucks, and the total weight of any single vehicle, including load and vehicle itself, to be not in excess of 12 tons.

It is hoped that by taking the matter in hand early, it will be possible to have a bill enacted in the states named that will serve as a model for other states and so result in a national uniformity of regulations for motor trucks, just as the New York automobile law has become the standard form for pleasure cars.

* * *

Co-Operation with S. A. E.

In order to avoid possible duplication of effort and confusion in the matter of motor truck standardization, the Commercial Vehicle Committee has instructed its secretary to confer with the Society of Automobile Engineers with the object of agreeing upon the lines along which each organization shall proceed in recommending standards. It is felt that standardization of matters directly affecting the sale, use and guarantee of trucks comes within the province of the Manufacturers' Association, while the engineers' society is the proper body to endeavor to bring about uniformity of engineering practice in the design and construction of the chassis within the general dimensions, rated load and speed capacity, etc., which the manufacturers agree upon.

* * *

Frame and Platform Heights.

Data gathered by the committee show a wide variation in heights of frames and body platforms from the ground. Chassis frames, without load, range from 22 inches for an 800 pound wagon to 46 inches for a 4½ ton truck, and platforms without load vary from 26 to 52½ inches. While uniformity of frame heights seems desirable, it is considered advisable that they should bear a practical relation to the heights of railroad car floors and freight and express transfer platforms in order to facilitate loading and unloading. This subject is being investigated.

* * *

Still Gathering Statistics.

The work of gathering statistics of motor wagon production and sale in the United States up to the end of last year is still in progress. Returns have been received from 65 companies. It is hoped that companies that have not yet complied with the request to furnish the desired figures will do so without delay so that returns will be complete, otherwise the work already done will be partially nullified and the result unsatisfactory. Unless all the manufacturers send in reports on the anonymous blanks supplied for the purpose, the published results of the compilation will do the industry an injustice by giving the impression that it is not nearly of the magnitude and importance generally supposed.

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Among the Makers.

Concrete Evidence of the Boom in the Power Wagon Industry.

Malvern, Ark.—The Panama Manufacturing Co. has been organized to make motor trucks.

* * *

Los Angeles, Cal.—The Union Tool Co. has contracted for the erection of a $500,000 plant in which to build motor trucks.

* * *

Dover, Del.—The John J. Funk Combination Steel and Pneumatic Tire Co. has been incorporated with $200,000 capital to make tires.

* * *

Wilmington, Del.—The Lansden Company, capital $1,000,000, has been incorporated to make motor wagons.

Wilmington, Del.—The Randolph Motor Truck Co., capital $100,000, has been formed to manufacture motor trucks.

* * *

Washington, D. C.—The Bernston Spring Wheel Co. is to build a resilient steel wheel for motor wagons and proposes to operate a factory in this city.

Washington, D. C.—The International Motor Company has opened a branch at 811 Seventeenth street N. W. A service department under the management of John S. Larcombe, Jr., will be maintained for Mack, Saurer and Hewitt trucks.

* * *

Jacksonville, Fla.—C. P. Alyea of this city claims to have invented a balanced rotary valve that does away with over 50 per cent of the parts now embodied in the construction of automobile engines.

* * *

Belleville, Ill.—Richard Shaul is in this city trying to interest people in a motor truck company which he is endeavoring to organize.

* * *

Chicago, Ill.—The Byam Tire & Rim Co., capital $50,000, has been incorporated to make wheel parts for motor trucks.

Chicago, Ill.—The International Harvester Co. has leased a two-story structure at 1814-16 Michigan avenue to be occupied as a sales and display rooms for its motor wagons.

Chicago, Ill.—The Mogul Motor Truck Co. has increased its capitalization from $125,000 to $500,000.

Chicago, Ill.—The Monitor Automobile Works, Janesville, Wis., have moved their general sales and publicity departments to 1421 Michigan avenue, Chicago. J. E. Norling, secretary and treasurer, will manage this new office and F. W. Stewart will be sales manager. It is rumored the company will manufacture 2-ton and 3-ton models next season.

Chicago, Ill.—The Perfection Storage Battery and Lighting Co. has been organized by Carl E. Winters.

* * *

De Kalb, Ill.—The Joliet Auto-Truck Company has changed its name to the Joliet Auto Tire Company and increased its capital stock from $10,000 to $75,000. The concern will market a tire-filler which is intended to do away with inner tubes in pneumatic tires. The company plans the construction of a $65,000 factory.

* * *

Streator, Ill.—L. P. Halladay, once manufacturer of the Halladay touring car, has re-engaged in business here and will manufacture parts and specialties.

* * *

Elkhart, Ind.—The Bucklen Auto Truck Mfg. Co. will manufacture a complete line of gas wagons ranging from 1,000 pounds to 5 tons capacity. The plant will be established by Herbert E. Bucklen and his son. Headquarters will be in Elkhart and Chicago.

* * *

Burlington, Ind.—The Burlington Auto Traction Co. has been formed with a capital of $5,000. Loron Q. Dunn and Z. M. Dunn are directors.

* * *

Indianapolis, Ind.—The Mais Motor Truck Co. has increased its manufacturing facilities by adding 20,000 feet of floor space to its plant. The factory is working day and night to keep up with orders. Specifications have been received for machines for use in the Panama Canal.

Indianapolis, Ind.—Smart Auto and Manufacturing Company, Indianapolis, to manufacture automobiles and parts has been formed; capital stock, $50,000; directors, O. S. Srader, D. W. Reed, F. W. McCredie, O. E. Cummings, Brinay Smart, I. H. Shelton, L. B. Willis, Thomas Singleton and W. A. Virtue.

* * *

Wabash, Ind.—The Service Motor Car Co. has decreased its capital stock from $500,000 to $125,000.

* * *

Davenport, Iowa.—The East Davenport Machine Shop is now making motor trucks. Apart from this enterprise the Commercial Club is trying to form a truck company promoted by a Chicago man, who believes he can secure $70,000 for the venture.

Grinnell, Iowa.—The Spaulding Manufacturing Co. is manufacturing motor trucks.

* * *

Lewiston, Maine.—The Wade & Dutton Motor Car Co. will soon manufacture motor trucks.

* * *

Portland, Maine.—The Presto Inter-Rim Co. has been incorporated to sell automobiles and accessories. Capital $200,000. President, M. A. Thurston; Treasurer, H. P. Sweetser.

* * *

Albion, Mich.—The Hayes Wheel Co., Jackson, Mich., has purchased the plant of the Prouty Mfg. Co. and will begin the installation of machinery for making wheel hubs.

* * *

Big Rapids, Mich.—Grand Rapids representatives of a truck company were in this city recently looking for a factory site.

* * *

Detroit, Mich.—The Bower Roller Bearing Co. has purchased $50,000 worth of new machinery and equipment to take care of increased business.

Detroit, Mich.—The England Mfg. Co. has been organized with $50,000 capital to manufacture pressed steel bodies. Fred England, J. W. Foster and J. A. Davis are the principal stockholders.

Detroit, Mich.—The G. B. Essex Brass Co. has designed a light delivery wagon and will start manufacturing within a short time.

Detroit, Mich.—The Federal Motor Truck Co. has taken title to three acres of ground and the buildings formerly occupied by the Van Dyke Motor Car Co., on Leavitt avenue west of Junction avenue.

Detroit, Mich.—The Jolls Motor Truck Co. has been organized with $20,000 capital. LeRoy E. Jolls is principal stockholder.

Detroit, Mich.—The Michigan Electric Welding Co., successor to the Detroit Welding Co., has moved the entire equipment into the plant formerly occupied by the Universal Radiator Co., purchased by the Michigan Electric Welding Co. The company is planning to build a three-story addition to its present plant.

Detroit, Mich.—Robert and Louis Hupp have bought eight acres of land, joining their present holdings on Lycaste avenue. The purchase indicates a substantial enlargement of the R. C. H. plant.

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Detroit, Mich.—M. L. Pulcher of the Federal Motor Truck Co. has been elected to membership in the N. A. A. M.

Detroit, Mich.—Pratt, Carter, Sigsbee & Co. will shortly move into a large factory and manufacture 800-pound motor wagons on a large scale. The truck will be named the Wolverine.

Detroit, Mich.—F. K. Parks of the Universal Motor Truck Company has become president of the New York corporation which has been established as a branch of the Detroit Company, taking over the business of the Universal Motor Truck Company of New York, formed by Howard Walton when the Detroit company was started, and successfully run by Mr. Walton, who sold about 40 trucks. Mr. Walton becomes vice president of the new corporations. Samuel Mann is treasurer and George Wheeler secretary.

Detroit, Mich.—The Sewell Cushion Wheel Co. has been incorporated with $300,000 capital to make wheels and tires. I. S. Kearney is the incorporator.

Detroit, Mich.—The T. C. F. Mfg. Co., 650 Woodward avenue, has been formed to manufacture the Crary acetylene gas starter.

Detroit, Mich.—It is reported the Universal Motor Truck Co. will manufacture a six-cylinder motor truck.

Detroit, Mich.—The Wagenhals Motor Truck Co. has temporary quarters at 668 Grand River avenue while arranging for the construction of a factory in Detroit.

Grand Rapids, Mich.—The Grand Rapids Motor Truck Co. has been incorporated with a capitalization of $600,000.

* * *

Manistee, Mich.—The Manistee Automobile Co. has been organized to make light gas wagons. The capital stock is $51,000. Charles Elmendorf is president and general manager, and George N. Burr is secretary and treasurer.

* * *

Saginaw, Mich.—The Argo Electric Vehicle Co. is hastening the addition to its plant in order to take care of increased business.

* * *

Baltimore, Md.—The Elastic Wheel Co. has been organized with $1,000,000 capital to manufacture and deal in automobiles and other motor vehicles.

* * *

Boston, Mass.—The Kilgore Mfg. Co., 883 Boylston street, is manufacturing a shock absorber for heavy motor trucks.

* * *

Boston, Mass.—The Universal Motor Truck Co. of Detroit has established a New England branch at 883 Boylston street. Charles A. Malley is in charge.

Kansas City, Mo.—The H. E. Wilcox Motor Car Co. of Minneapolis has opened a distributing branch at 1325 Walnut street. R. E. Chamberlain, assistant sales manager, will be in charge, assisted by M. D. Savage.

* * *

Buffalo, N. Y.—By the purchase of four prominent motor establishments of Buffalo, the Buffalo Electric Co. comes into possession of one of the best factories in Buffalo for the manufacture of motor wagons. The concern plans to do business on a large scale. It is capitalized at $1,000,000.

Buffalo, N. Y.—The Frontier Tire & Rubber Co., 1054 Main street, has begun the manufacture of automobile tires. The officers are as follows: President, Orson E. Yeager, president of the Chamber of Commerce, director Union Stock Yards Bank and president of the Victor Motor Truck Company; first vice president, Frank V. E. Bardoll, president Eastern Concrete Steel Company; second vice president, John W. Gibbs, contractor, president Main Street Development Company; treasurer, George T. Roberts, treasurer Eastern Concrete Steel Company; secretary, M. F. Dirnberger, Jr., director Union Stock Yards Bank, director General Baking Company; director Mohn-Hunter Laundry Company; general manager, John N. Gardner.

Buffalo, N. Y.—At a special meeting of the Victor Motor Truck Co., Orson E. Yeager, president of the Buffalo Chamber of Commerce, was elected president of the truck concern. Additional directors elected at the meeting included H. B. Milward, Brooklyn, and Orson E. Yeager and John A. Murphy, vice president, both of Buffalo, and both of whom have recently become stockholders of the Victor company.

* * *

Elmira, N. Y.—The Hatfield Auto Truck Company, of Elmira, N. Y., said to have outgrown its present quarters, is seeking a new location in the Middle West.

Elmira, N. Y.—The Resillio Tire Filling Co., First and State streets, will manufacture a tire-filling compound.

* * *

New York, N. Y.—The Dual Wheel Co., incorporated with $300,000 capital, will produce motor wagon wheels and an eight-wheel motor truck. Alexander Dow is behind the enterprise.

New York, N. Y.—Dr. Rudolph Diesel, inventor of the Diesel engine, is in this country. He predicts that his engine will be used as a motive force for power wagons in America. Instead of compressing a homogeneous mixture of fuel and air, only pure air is compressed. The compression is carried to a point where the air is sufficiently heated to ignite the fuel, which is pumped into the cylinder after compression is complete, the injection being continued during a portion of the working stroke.

New York, N. Y.—The Federal Trucking Co., New York City, has been organized with $20,000 capital to manufacture and deal in motors. Corporators: Don B. Abbott, J. D. Frackenthal and James L. Kauffman.

New York, N. Y.—The Field Electric Bus Co., capital $10,000, has been formed to manufacture electric cabs, omnibuses and other vehicles. William Eastman, Cornelius J. Field and Burgess Osterhout are the incorporators.

New York, N. Y.—The Globe Ball Bearing Co., 50 Church street, has secured the American agency of the Société de Mécanique of Clichy, France, manufacturer of the Duplex bearings.

New York, N. Y.—The Lippard-Stewart Motor Sales Co., New York City, has been formed with a $25,000 capitalization to sell Lippard-Stewart motor trucks. Incorporators are: T. W. Pelham, T. W. Pelham, Jr., and C. E. Dunn.

New York, N. Y.—The Motorflex Equipment Co., New York City, has been organized with $150,000 capital to manufacture automobile parts and accessories. Rufus L. Patterson, Sydney I. Prescott and Charles B. Goldsborough are the promoters.

New York, N. Y.—The Polack Tyre & Rubber Co. has been absorbed and succeeded by a New York corporation of the same name capitalized at $700,000. The officers of the new company are: President, Max Polack, who is now managing director of the parent company in Waltershausen, Germany; treasurer, Adelbert Hauschild, who was vice president of the Maine corporation; secretary, Milton Dammann. Hugh Helstaedter, manager of the Polack Tyre Co., of London, is also one of the directors of the new American company. The Pennsylvania Rubber Co., of Jeannette, Pa., which has made the Polack tire in this country, will continue that service for the new corporation.

New York, N. Y.—F. D. Dorman has resigned as secretary of the United States Motor Company to become president of the Steinbock Engineering Co., which has been formed to make moderate priced motor wagons. His place will be taken by L. E. Latta, formerly secretary of the Maxwell-Briscoe Motor Co.

* * *

Niagara Falls, N. Y.—C. McK. Hepburn, of the Niagara Lead & Battery Co., and J. Clark, of the Clark Motor Co., Buffalo, have organized the Cleburn Motor Co., in Niagara Falls, N. Y., which will manufacture a 1,000-pound electric wagon equipped with the Salom battery.

* * *

Rochester, N. Y.—The Seldon Motor Vehicle Co. is about ready to market a one-ton motor wagon.

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Syracuse, N. Y.—The Sanford-Herbert Co., maker of one-ton motor wagons, has raised its capital from $25,000 to $50,000. The company has changed its name to the Sanford Motor Truck Co.

* * *

East Orange, N. J.—The Kadix Newark Motor Truck Co, capital $200,000, has been formed to manufacture motor trucks. The incorporators are: D. Lester Dunn, Gustave F. Kallberg and Russel M. Colburn.

* * *

Newark, N. J.—The Atlantic Vehicle Co. has engaged in the manufacture of electric wagons. Arthur J. Slade is the designer. The factory is in North Newark.

* * *

Cincinnati, Ohio.—The drawings, patents, equipment and material belonging to the Power Car Co., Cincinnati, Ohio, have been purchased by a concern to be known as the Cincinnati Motors Co. The new owners will incorporate the business in the near future, and will take immediate steps to market the car originally designed by the Power Car Co., under the name of the Cincinnati truck. Those behind the movement include Franklin Alter, Harry T. Alter and J. B. Dean, all of Cincinnati.

* * *

Cleveland, Ohio.—The Cleveland Motor Truck Co. has decreased its capitalization from $250,000 to $1,500.

* * *

Cleveland, Ohio.—The K. D. Carburetor Co., capital $5,000, has been formed to make carburetors. Incorporators: C. A. Riemenschneider, Henry C. Gahn and E. L. Fraser, Jr.

* * *

Dayton, Ohio.—The Veitch Motor Mfg. Co. has been formed to manufacture automobile parts. The company is headed by New York capitalists, and has plans under way for the construction of three large buildings. Capital to the extent of $200,000 has been subscribed. The plant will be under the supervision of J. S. Harris.

* * *

Galion, Ohio.—The Cleveland-Galion Motor Truck Co. is rapidly getting prepared to manufacture motor wagons on a large scale.

* * *

Kenton, Ohio.—The Leitner Motor Truck Co. has established a plant in the Carter building on West Franklin street, and will start operations with 25 men.

* * *

Lima, Ohio.—B. A. Gramm, well known and successful pioneer in power wagon manufacture, has withdrawn from the Willys-Overland interests which recently secured control of the Gramm Motor Truck Company, and will form a new company. Mr. Gramm announces the early production of new, simplified and standardized models. He has surrounded himself with a strong organization.

* * *

Toledo, Ohio.—The Moore Motor Truck Co. has increased its capital stock from $15,000 to $200,000. The concern is considering a factory site in Findlay.

* * *

Findlay, Ohio.—The Toledo Metal Hub Co. has ben formed with $20,000 capital to manufacture parts. Incorporators: Leonard Bauroth, Hugo Bickel, George Mannes and others.

* * *

Harrisburg, Pa.—The Harrisburg Manufacturing Company has built a truck from specifications submitted by the Morton Motor Tractor Co. The latter concern expects to manufacture the machines on a large scale after being satisfied with road tests made by its first model.

* * *

Philadelphia, Pa.—Samuel S. Eveland, 2226 Land Title Building, has contracted to sell the output of the United States Light & Heating Co., Niagara Falls, N. Y., manufacturers of an electric self-starting and lighting device.

* * *

Pittsburg, Pa.—The Model Gas Engine Works of Peru, Ind., are erecting a plant in this city having a capacity of 25 gas engines a day. Considerable Pittsburgh capital is behind the enterprise.

* * *

Providence, R. I.—The Consumers' Rubber Co., capital $600,000, has been organized to manufacture rubber goods. The incorporators are: Percy W. Gardner, Alexander L. Churchill, E. B. Moulton, Providence.

* * *

Alexandria, Va.—The Hercules Truck Co. has been formed with $100,000 to manufacture motor trucks. Incorporators: S. W. Woodward, O. Ducker and E. S. Parker.

* * *

Washington, D. C.—The Ford Auto Truck Co., Clarendon, Alexandria County, has been formed with $25,000 capital to deal in Ford machines.

* * *

Appleton, Wis.—The Four Wheel Drive Automobile Co., Clintonville, Wis., will locate its new permanent plant at Appleton, provided that Appleton capital buys $100,000 worth of stock of the corporation.

* * *

Juneau, Wis.—The Juno Motor Truck Co., successors to the Brodesser Motor Truck Co., has elected the following officers: President, L. C. Pautsch; vice-president, Theo. Henning; secretary, Henry Henning; sales manager, Wm. McDougall. Mr. McDougall was general agent of the Kisselkar at Milwaukee.

* * *

Manitowoc, Wis.—The Aluminum Castings Co., Cleveland, Ohio, is preparing to remove its branch plant from Manitowoc to Milwaukee.

* * *

Milwaukee, Wis.—Charles Abresch, president and treasurer of the Charles Abresch Co., pioneer manufacturer of motor trucks, died at Milwaukee, April 28, aged 62 years.

* * *

Racine, Wis.—The Racine Mfg. Co., manufacturer of bodies and trimmings, has plans for two large additions to be built at once.

* * *

Toronto, Can.—The Baker Motor Vehicle Co. of Canada has been incorporated in Toronto and will build a factory there and one in Walkerville immediately. The company is capitalized at $100,000. The promoters are J. H. Walker and H. H. Walker, of Walkerville; W. H. C. Burnett, of Detroit, F. R. White, R. C. Norton, G. H. Kelly and O. B. Henderson, of Cleveland.

* * *

St. Catharines, Ont.—The Reo Motor Car Co. expects to build a plant here and turn out 1,000 machines next year.

RULON GOES TO CHICAGO.

The International Motor Company, handling the Saurer, Mack and Hewitt power wagons, announces the appointment of Frank C. Rulon to fill the position of manager of its Chicago branch. Mr. Rulon was formerly associated with the sales department of the Philadelphia branch, and has been highly successful in the sale of motor wagons.

Realizing his hustling ability, the company has selected this genial motor man to build up its business in the Western metropolis.

PROBST WITH KANAWHA.

Karl Probst, formerly of the Lozier, Peerless and Seagrave companies, has been appointed general manager with the Kanawha Auto Truck Company, Charleston, W. Va.

G.-M.-C. COAST RECORD.

One hundred and thirty-three General Motors trucks are used by San Francisco merchants. The largest number owned by one firm is eight, the next, five, and there are several who use two or three. It is remarkable to note the diversified lines of business represented—steel, ice, hardware, furniture, transfer, wine, gas, brewing, electric and others.

In a single week, recently, the motor buses from one of the garages of the London (Eng.) General Omnibus Company totaled 105,600 miles on the road.

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Fourteen G. V.'s in the service of the American Express Company at Baltimore.

BOOK REVIEW.

A most important and timely contribution to the literature of the modern motor vehicle has just appeared in the form of a well printed and illustrated work of four volumes, entitled "The Cyclopedia of Automobile Engineering," published by the American School of Correspondence of Chicago, Ill.

Commencing with Volume 1, there are first introduced the fundamentals of internal-combustion-motor operation, clear and simple explanations being provided of the various cycles of operation, the essential mechanical elements, the conditions of efficiency, reliability, etc.

Then follows a section on "Gasoline Automobiles, Part I.," in which there is fully treated the general design and requirements of modern motor cars, with special reference to the most recent and important developments.

"Gasoline Automobiles, Parts II. to V.," inclusive, comes closer down to details, and abounds in accurate and specialized information useful to the engineer and repairman, without being uninteresting to the layman, and fully covering the parts and essentials of which the complete automobile is constituted.

"Electric Automobiles" is a special section devoted to the design, construction, operation, care and maintenance of the class of vehicles to which it relates. An example of the thoroughness with which this subject is treated are the up-to-date and accurate data relating to the latest type of Edison storage battery.

"Steam Automobiles" is another specialized section, completely covering a type of vehicles that, while it is not the most important, is nevertheless of much interest.

"Types of Automobiles" is a discussion by an eminent authority of the development of the automobile to its present form, with exhaustive consideration of the factors that have so far controlled the evolution of the motor vehicle and that may be expected to determine it in the future. In the concluding section under this heading is some very interesting material for the man about to select a car.

"Motorcycles" is self-explanatory, and covers the "two-wheeled automobile" as comprehensively as could be desired.

Volume III. is introduced with a chapter on "Commercial Vehicles," which are exhaustively discussed throughout the whole variety of types that prevail in this field.

"Private Garages and Repairs" is of a special interest to the owner and the chauffeur, and besides including much information about garage architecture and equipment, conveys interesting information about the sort of repairs and overhauling that can reasonably be done away from a fully equipped repair shop.

"Automobile Driving" is of prime interest, and no one who reads through this portion of the text carefully can finish without a very definite idea of the essential requirements and the points to be observed in becoming a competent operator of a car, able not only to drive with skill, but also qualified to take care of the mechanism.

"Motorboats" is another example of how completely all types of motor vehicles are treated in this cyclopedia, everything regarding the "aquatic automobile" being given full attention under this heading, even including rules of navigation.

Volume IV. is entirely devoted to the aeroplane.

The four volumes total 1,400 pages, with 1,200 illustrations, and the reader's progress is greatly helped by a closing section in each volume of "Review Questions." There also is an excellent glossary of motor vehicle and aviation terms, and an unusually complete index.

A FLEET OF 62.

The illustration shows 14 of the fleet of 62 General Vehicle Company's electric power wagons in the service of the American Express Company. All but four of these have been bought since November of last year. These 14 machines are in use in Baltimore, Md., a city which has increased its use of electric wagons by 1,000 per cent within two years. Much of this splendid increase is due to the Consolidated Gas, Electric Light & Power Company of that city, which within a year has purchased 42 machines from the General Vehicle Company, and which greatly helps the cause of the electric by its fine administration and garage work for concerns owning and operating electric wagons.

PACKARD CONVENTION.

Methods and policies which govern the sale of Packard cars and trucks were discussed at a convention of dealers held recently at the Packard factory in Detroit. The importance of Packard service in securing new business and in building up a permanent clientele played an important part in the discussion. While the list of Packard dealers embraces about 100 cities, only about 20 of the principal centers of trade were represented at the conference.

Men prominent in the retail end of the business are included in the list of those who attended: M. J. Budlong and L. J. McCracken, New York; Alvan T. Fuller, A. L. Danforth and F. C. Graves, Boston; E. B. Jackson and W. G. Brooks, Philadelphia; H. M. Allison and F. E. Parker, Murray and W. P. Berrien, Pittsburgh; J. W. Tarbill, Cincinnati; W. J. Parrish, Cleveland; Cuyler Lee and J. H. Matthias, San Francisco; Ginder Abbott, New Orleans; R. J. W. Hamill, Baltimore; J. J. Mandery, Rochester; O. L. Halsey, St. Louis; E. C. Anthony, E. E. Caister, Los Angeles; C. Arthur Benjamin, Syracuse; William Love, Toledo; F. E. Avery, Columbus, Ohio.

British highway engineers are beginning to increase the depth of concrete foundations for roads from 6 to 9 inches, on account of the heavy motor wagon traffic.

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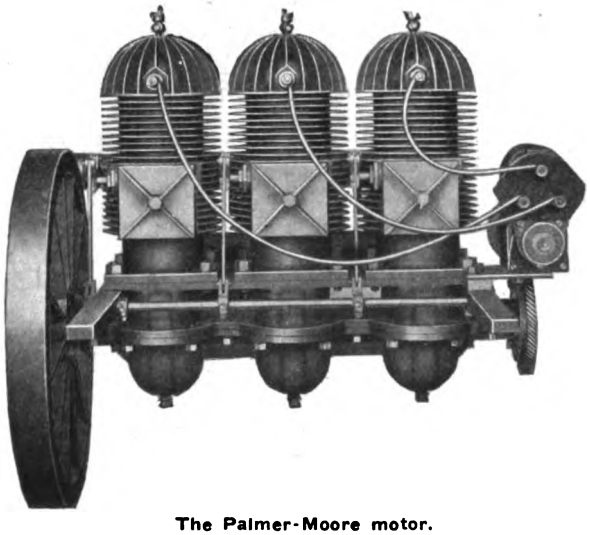

The Palmer-Moore motor.

PROGRESS IN DETROIT.

The Detroit municipal departments will be so completely "automobilized" in the near future that the city will undoubtedly become the Mecca for everything pertaining to specially designed motor cars. Even now officials from all over the country are making trips to the automobile center to examine the various types of horseless equipment in use.

The latest thing is a motor wagon to make hurry-up calls to pick up mad and injured dogs, and the police department has just placed an order with General Motors Truck Company for a vehicle that will answer these needs. The body, which will be mounted on a 1¾-ton chassis, will be equipped with six compartments, having space for 15 cages of different sizes. Each compartment will be provided with swinging doors and the cages will close automatically, so the dogs will be unable to escape. Watering troughs will not only supply drinking water, but will help to keep the cages cool. A screened railing on top of the roof will be used for storage space for nets and other supplies. Place has also been provided for a medicine chest.

The department has also placed an order with the same company for a 2½-ton truck to be used by service men in constructing and keeping in repair the telegraph and telephone lines. This machine will be provided with a winch, enabling cables and conduits to be laid in a much easier way than by the old method.

With these additions, the Detroit municipal departments' horseless equipment will be the most complete in the world, for they will then have in use types for every public service, including ambulances, patrol wagons, fire apparatus of every description, and coal wagons.

GOOD FOR PACKARD.

Through its New York office, the American Express Company has ordered ten two-ton Packard trucks, with the provision that all must be shipped in May. This makes 33 Packards in the service of one concern.

PALMER-MOORE MOTORS.

Four-cycle internal-combustion motors have maintained their popularity for motor car service because of wide speed range and flexible control over that entire range. Two-cycle motors, on the other hand, are extremely simple, light, inexpensive to operate and maintain, but, as ordinarily built, have been at a disadvantage in motor car service, in that the speed ratio is limited.

The Palmer-Moore two-cycle engine overcomes such criticism perfectly because the size of the port openings can be varied by means of rotary shutters so geared that the driver can increase or decrease the effective port areas equally and simultaneously in all cylinders. This improved construction, employing variable sized ports, found exclusively in Palmer-Moore motors and broadly covered by basic patents, enables the driver to have a high speed or low speed engine at will. Further, the ordinary work and normal loads are handled at the comparatively low engine speed of about 500 r. p. m. with much additional power in reserve and costing nothing when not in use. The motor responds instantly to a shift of the control lever, thus making the flexibility equal to that of a four-cycle motor and also doing away to a large extent with gear shifting.

The low speed of the motor under average duty is obviously an advantage over the usual high speed of two-cycle motors, and four-cycle as well, in that wear on all bearing surfaces is reduced, and the tendency toward overheating is so slight that it can be successfully air-cooled. Another advantage of low engine speed is a decrease in the noise of operation.

The Palmer-Moore motor is built to develop 18 horsepower from three cylinders, each 4-inch bore by 4-inch stroke, and the cranks are set at 120 degrees. The propulsive effort is therefore as smooth and the operation throughout as perfect as that of a well adjusted four-cycle motor with six cylinders.

Cooling is effected by draft upon ribs projecting from each cylinder, the draft being intensified by the flywheel, the spokes of which are shaped to form a fan. Such a fan, being direct-connected, cannot stop while the motor is in operation.

Ignition occurs at a fixed point of the stroke and is produced from a magneto geared onto the main shaft. Any other standard ignition system may be used. No batteries are required for starting, yet "spinning" of the motor is seldom necessary.

The carburetor also is set at a fixed opening and delivers into a specially designed manifold which increases the travel of the gases and gives them a chance to heat before entering the cylinders. The driver controls the motor simply by varying the port areas to produce a high, medium, or slow-speed motor as the conditions may demand. A single control lever on the steering wheel, similar to the throttle of a four-cycle motor, is provided for this purpose, hence the Palmer-Moore is both simple and "foolproof."

The cylinders are of the three-port type with the usual intake, by-pass and exhaust ports. Each port is provided with a rotary shutter, the movement of which opens and closes the port, thus varying the total effective port area and consequently the flow of gases through same.

The shutters on the ports of each cylinder are set exactly alike, operated through similar sets of levers geared to a common operating rod which in turn connects with the control lever. The corresponding port openings are therefore maintained identical in all cylinders and change simultaneously upon movement of the control lever.

Increasing the size of the ports maintains a uniform time interval between the uncovering and covering of the ports by the piston at all engine speeds, admitting the same amount of explosive mixture and effecting as complete cylinder cleansing under high speed as under low. When the engine is running at low speed the ports are nearly closed. As the ports are opened by the control lever the engine speed increases. The construction of the crankcase permits removal of the bottom half for inspection or bearing adjustments. The lubrication of the motors is accomplished by mixing the cylinder oil with the gasoline in the fuel tank. The Palmer-Moore motor is manufactured by the Palmer-Moore Company, Syracuse, N. Y.

CALCULATIONS MADE EASY.

A neat celluloid fraction calculator is being distributed by the Standard Roller Bearing Company, Philadelphia. It is a form of rotary slide rule, of vest-pocket size, for indicating fractional equivalents in 4ths, 8ths, 16ths, 32ds and 64ths.

Russia begins a 2,000-mile road test for military motor wagons in June.

The Lincoln Park (Chicago, Ill.) commissioners have purchased a Federal truck for hauling supplies.

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NEW WHEEL MACHINES.

The Defiance Machine Works, Defiance, Ohio, manufacturers of the well-known "Defiance" motor-truck wheel machines, have announced the completion of two new heavy tools which are characterized by their staunch construction and efficiency. They are designed and built to meet every demand of commercial motor vehicle wheel builder, being absolutely positive and accurate.

The first of the heavy machines is the "No. 102 auto-truck wheel sectional felloe shaping machine," as shown by the accompanying engraving. This machine is specially designed for shaping the inside and tread of heavy sectional felloes, ranging in circles from 24 to 42 inches, and any widths up to 12 inches. From one to four sections of felloes can be operated upon at one time. The sections are placed into the machine with their backs resting upon the parallel bars of the screw clamps for the first operation of truing the inside circle. For the second operation they are placed into the clamps with the inner circle resting upon the outside of the parallel bars for dressing the tread.

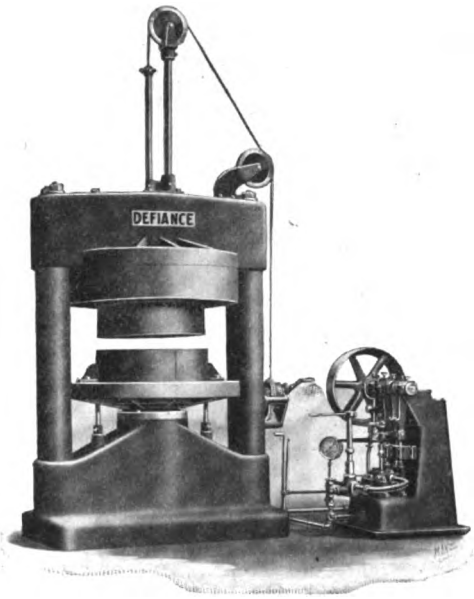
An ingenious device is furnished for setting the cutter in the proper position to obtain the desired diameter of both the inner and outside circles. This adjustment can be made instantly and is absolutely correct.

The chuck is mounted upon a substantial shaft and is fitted with four special jaws or clamps for supporting the sections of felloes which are actuated simultaneously by turning with a wrench any one of the four screws, opening and closing them for cutting any diameter within the range of the machine.

The cutter bar, which is made of hammered steel of large diameter, rotates in self-lubricated bearings and is quickly moved to or from the work by a convenient hand wheel.

The milled cutter is made of special steel and contains a large number of cutting edges, which insures rapid and smooth work. It is brought up to its work by a hand wheel, which is provided with micrometer adjustment for regulating the cut. The feed is automatic and is arranged with automatic safety cutout for arresting the motion at the completion of the cut.

The operator has complete control over the machine from the work side. The chuck and the rotating parts of the headstock can be instantly set in motion or arrested by the use of convenient levers. The machine possesses every convenience of operation. The machine takes 7½ horsepower and occupies a floor space of 46 by 118 inches.



150-ton hydraulic truck-wheel tire press.

The other engraving represents the "No 6, 150-ton hydraulic auto-truck wheel-tire pressing machine," specially designed for pressing the steel tires on motor-truck wheels. It will accommodate wheels up to 55 inches diameter, and will take 36 inches between the plates when wide open and the filler plate above is removed. The filler plate is used when medium-sized work is being done, and for extreme widths of rims it is removed. The lower plate is fitted with three adjustable dogs for perfectly centering the tire.

The windlass is used for the purpose of raising the wheel upon which the tire is to be pressed up squarely against the bottom of the upper plate. The shaft which is attached to the windlass table is fitted with a heavy thread, which is screwed into the false hub for supporting and centering the wheel during this process. This shaft can be instantly attached or released. The windlass is usually placed in the position as shown by the engraving, but where the machine is set into the floor it can be quickly attached at a higher position.

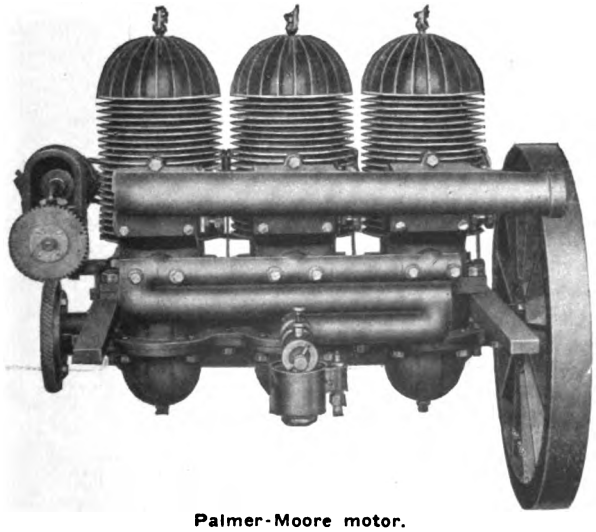
The hydraulic ram is 12 inches in diameter and has a movement of 24 inches. It is placed within the lower cross-beam and the liquid is delivered to it through hydraulic tubing. The relief pipe is extra large to insure a quick return movement. The pump is of the four-cylinder type. The body or reservoir is cast in one piece and holds one barrel of oil, light engine oil giving the best results.

The pressure gauge is located in a convenient position to the operator and registers the exact pressure. The safety valve may be set to any desired pressure, which may be instantly increased as desired, and when the controlling lever is released the pressure returns to its original setting. The machine takes 10 horsepower and occupies a floor space of 48 by 72 inches, and the pump 32 by 36 inches.

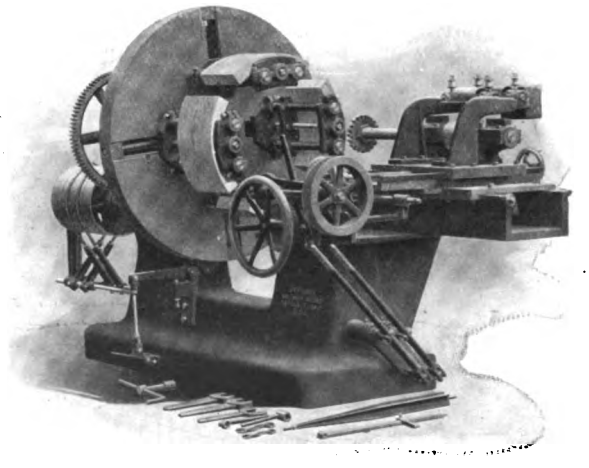
NEW LOCOMOBILE BRANCH.

The Locomobile Company of America announces the opening of a factory branch and service station in Los Angeles for the convenience of customers in Southern California and the Southwest. Until a proper headquarters can be erected, this factory branch will be located at 942 South Grand avenue, Los Angeles. J. Murray Page, who has been connected with the Locomobile Company almost since its inception, and who is well known both on the Pacific coast and in the East, has been appointed manager.

Gasoline has "gone up" to 14 cents a gallon.



Palmer-Moore motor.



No. 102 motor-truck-wheel sectional felloe shaper.

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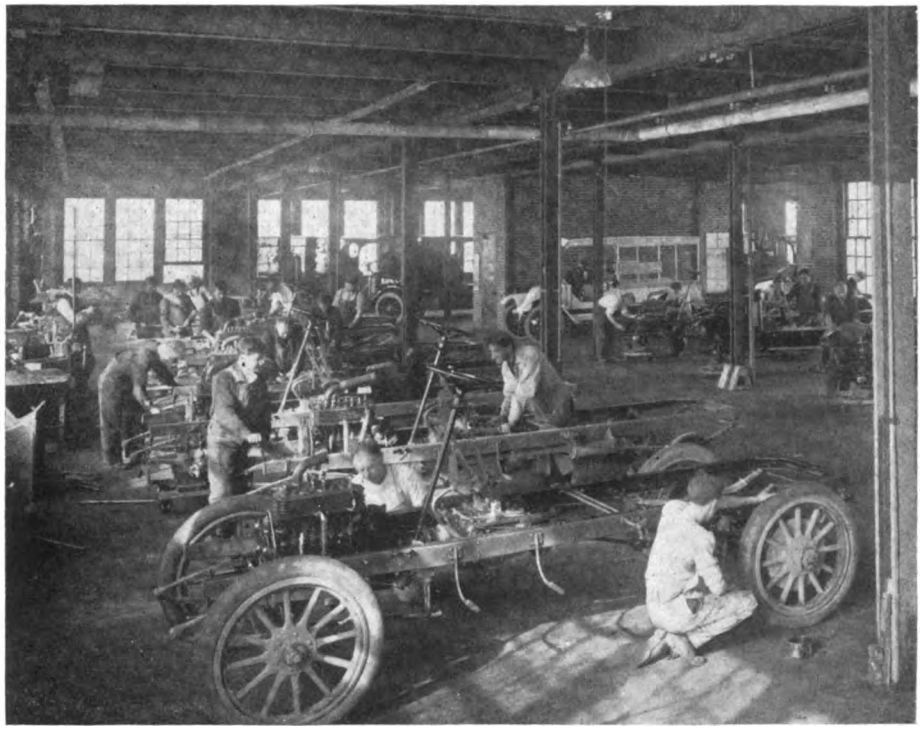

A part of the assembling room of the Lippard-Stewart Motor Car Co., Buffalo, N. Y., maker of high-class light motor delivery wagons.

C. B. SHANKS JOINS KELLY.

That the far west is an intensely valuable territory for power wagons is firmly believed by the Kelly Motor Truck Co. of Springfield, Ohio. The same opinion obtains with, and is enthusiastically voiced by Chas. B. Shanks, who a few days ago signed a long term contract to manage the Kelly interests in a large territory embracing the following states: California, Arizona, New Mexico, Utah, Nevada, Montana, Idaho, Oregon and Washington.

The Kelly Motor Truck Co. has already made a good representation with its product in this important western territory, but now proposes to cultivate and develop it more intensively.

Headquarters for the new western department will be in San Francisco, where a branch depot for the sale and distribution of trucks and parts will be maintained. Mr. Shanks is well acquainted in the territory which is under his control, and on account of his known ability as a sales manager, which is the result of a dozen years' handling of large automobile factory outputs, it can be easily imagined that the distribution of Kelly power wagons will score a high mark in that large domain which is skirted by the Rocky mountains on the east and the Pacific ocean on the west.

In the handling of his territory Mr. Shanks will establish agencies in all the populous centers. He will have the assistance of factory experts who will cooperate to the end of insuring each owner of Kelly power wagons as near 100 per cent service satisfaction as is possible.

The Kelly Company will soon begin delivery of a new line of models which will be particularly adaptable to some peculiar conditions which exist only in the far west. Mr. Shanks is decidedly strong in his belief that the line will prove of very exceptional worth to the live agents in his territory. "I want agencies in every sales district throughout the west," said Mr. Shanks in Chicago a few days ago just as he was taking train for the coast, "and will welcome inquiry communications sent me in care of temporary address, Monadnock building, San Francisco."

ENTER WAGON DEALERS.

Fred J. Titus, traveling sales representative of the Alco, who is back from a trip through the Northwest and several provinces of Canada, says that in these sections there is a pronounced movement of wagon, carriage and farm implement dealers into the motor truck industry.

"In this condition we have a good indication of the importance the motor truck industry has assumed in the eyes of the business world," says Mr. Titus. "Carriage and wagon men realize that the motor truck is inevitable. They have noted the growth in demand for trucks. Even in small towns motorized hauling is being adopted, in some instances by single concerns and in others by two or more companies combining to systematize their transportation work.

"It is significant to note also the number of wagon dealers who have failed, some of them making the announcement that the arrival of the motor truck has caused it to be unprofitable to continue in business.

"The motor truck has come into widespread usage because of its appeal as an economy, and business men have shown a desire to investigate the possibilities of reducing delivery costs through the adoption of the truck."

G. V.'S IN N. Y. PARADE.

The following is the list of General Vehicle electric wagons which participated in the parade of the New York Motor Truck Club, on April 13 last:

Customer	Number	Capacity
New York Edison Co..	5	1,000-lb.
New York Edison Co..	1	2-ton
Alex. D. Shaw & Co...	1	3½-ton
J. Weber	1	2-ton
M. Groh's Sons.....	1	5-ton
M. Groh's Sons.....	1	2-ton
M. Groh's Sons.....	1	5-ton
Lincoln Safe Deposit Co.	2	3½-ton
Curtis-Blaisdell Co.....	1	5-ton
John Meyer.....	2	1,000-lb.
W. B. A. Jurgens.....	1	3½-ton
Tiffany Studios.....	1	1-ton
"Repetti"	1	1,000-lb.
General Electric Co....	1	2,000-lb.
Sprague Electric Works	1	2,000-lb.
Jacob Ruppert	3	5-ton keg
Jacob Ruppert	2	5-ton bottle
Jacob Ruppert	1	1-ton keg
Jacob Ruppert	1	1-ton bottle
Jacob Ruppert	1	2-ton emergency
N. Y. & Queens Elec. Lt. & Pr. Co.....	1	750-lb.
N. Y. & Queens Elec. Lt. & Pr. Co.....	2	1,000-lb.
General Vehicle Company	4	2,000-lb.
General Vehicle Company	1	3½-ton
Peter Doelger Brewing Co.		5-ton keg
Peter Doelger Brewing Co.	1	3½-ton bottle
United Elec. Lt. & Pr. Co.	1	750-lb. wagon
United Elec. Lt. & Pr. Co.	1	5-ton truck
United Elec. Lt. & Pr. Co.	1	1-ton truck
Motor Delivery Co.....	3	2,000-lb.
Brooklyn Edison Co....	2	2-ton
S. S. Glauber.....	1	2-ton
	49	

A Sampson truck loaded with furniture recently made a successful trip from New York to Baltimore.

The Federal Motor Truck Company is building 750 motor wagons this year, which is 50 per cent in excess of what was contemplated some months ago. Business is exceedingly good with this popular 1-ton machine.

An Indianapolis company is planning an advertising campaign between that city and San Francisco with a motor truck. The vehicle is to be equipped with portable wireless outfit, telegraph and telephone connection, typewriter and cooking utensils.

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RULES FOR DRIVERS.

The importance of properly loading a motor truck and some rules for correctly distributing the load are emphasized by the American Locomotive Company in instructions to drivers of trucks.

Among the suggestions, contained in a chapter of the new Alco instruction book, are the following:

"Balancing a load is a big factor in the successful operation of a motor truck. Do not place all the heavy articles on the rear of the truck. If you place a heavy article on the rear of the truck, put an article of like weight on the front also. Do not place the load on one side of the truck. If the load is small, center it. If you have a small and heavy load, such as steel rails, use a small body. Have the body constructed so that the load will be centered.

"There was one case of a large dealer in structural steel supplies who used a platform body which extended over the wheels. The truck pulled up to the loading platform sidewise. The shipping department employes, as a matter of convenience, pushed all the load of steel on one side. Of course, the springs on this side were weakened. The tires also showed abnormal wear on that side.

"If a tank body is used to haul over rough roads, it should be made only large enough to carry a normal load.

"Some drivers are unnecessarily hard on tires. The way the truck is loaded has a good deal to do with the wear. Balancing the load not only saves the tires and springs, but the driving mechanism also.

"Don't overload the truck. If the body is too big, don't load to the capacity of the body.

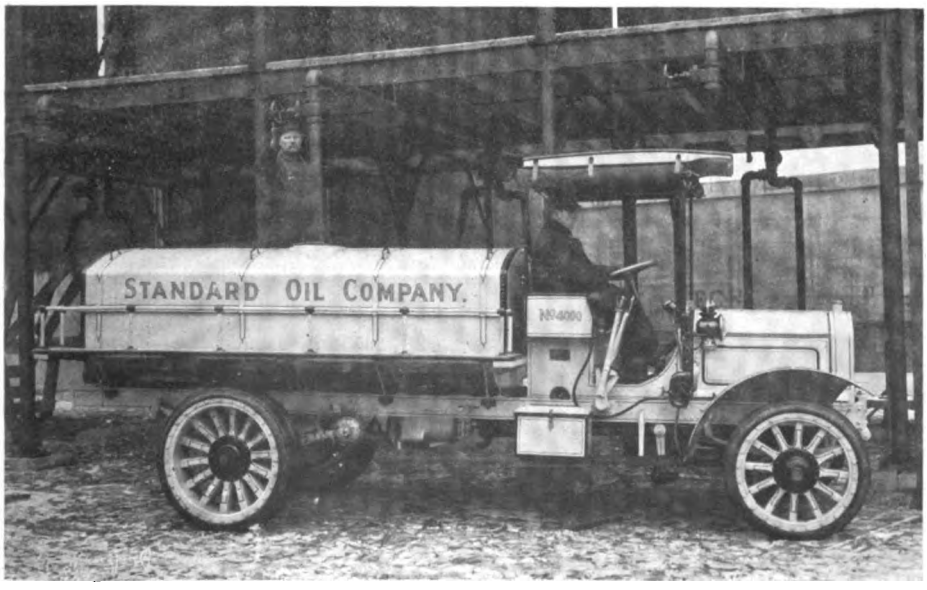
"When a horse is overloaded, he will not start. The load has to be taken off until he is able to proceed.

"When the power is applied in a motor truck, the truck will move, no matter what the load may weigh. It will do this even if greatly overloaded.

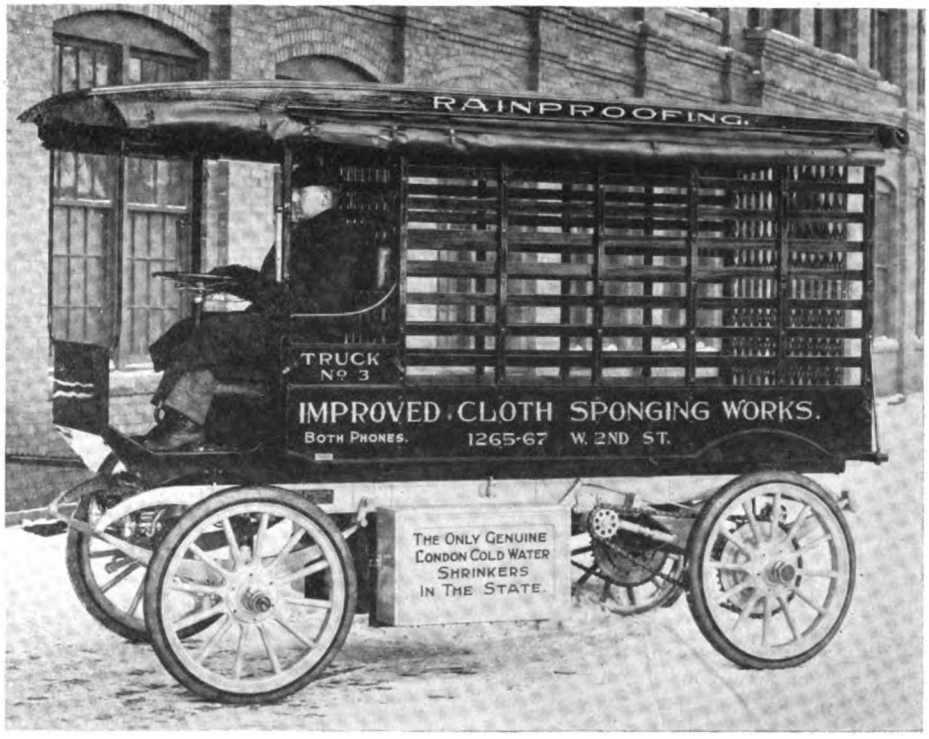
"But at the end of the season, when the truck is overhauled, poor judgment in loading tells. There will probably be many parts to replace that should not have been replaced for many seasons."

The Blue Taxicab Company, Brooklyn, N. Y., recently placed an order for 15 White taxicabs.

The Myer, Abrams & Co. agency in Boston has been making a hit by hauling around a big horse in a motor wagon. A big placard on the truck announces: "Lauth Juergens trucks do my work now."



Peerless power wagon in service of Standard Oil Company.



The Baker that made a notable record in winter.

GOOD RECORD BY BAKER.

This light Baker electric delivery wagon went into service under the hardest weather conditions which Cleveland had experienced for a period of more than ten years. Despite the fact that the thermometer constantly registered close to the zero mark and the snow, which was drifted everywhere about the city streets, the owner of the car declares that at no time was its regular service interrupted. It has been in service for six months and at no time has been put up for repairs of any description. The car is operated by a man who was totally inexperienced at the time he undertook to handle the truck. The proprietor of the concern, however, states that even in the hardest weather the car did not fail to make better than 70 miles on one charge of the batteries. This performance is thought to be quite remarkable, inasmuch as the makers do not unconditionally guarantee a mileage for this model with standard battery equipment of much more than one-half which this car accomplished A car of this type used in the city delivery service, where frequent stopping and starting are involved, is not required to make more than 35 or 40 miles in regular working hours.

NEW MOTZ AGENCIES.

The following agency connection has recently been made by the Motz Tire & Rubber Company, Akron, Ohio: Standard Tire & Rubber Company (tires and mechanical rubber goods), 104-106 Portland Street, Boston, Mass.

Owners of commercial motor vehicles in London, Eng., pay an annual gasoline tax (not bill) of $580,000.

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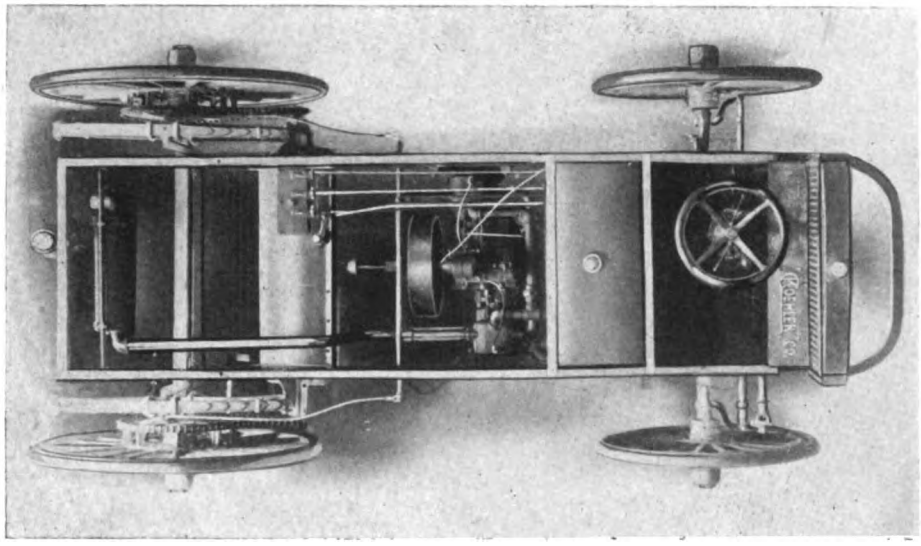


Chassis of the Koehler Commercial Car.

NEW SPLITDORF COMPANY.

With the formation of the Splitdorf Electrical Company, duly incorporated under the laws of New Jersey, with a paid-in capital of $3,500,000, and the election of John F. Alvord as president and C. F. Splitdorf as vice president of the new concern, the motoring world views a combination of interests of vast moment to the industry as a whole.

The company has been organized as an entirely new organization with a stock issue divided into $1,500,000 of 7 per cent cumulative preferred shares and the balance of two million dollars of common, with John F. Alvord acting for the Torrington Company of Torrington, Conn., the direct sponsor for the new corporation.

The wide interests of C. F. Splitdorf, Inc., of magneto, coil and spark-plug fame, are absorbed in the new company, with the object of enlarging the present huge business of the long-established house of Splitdorf, so indissolubly connected with electrical devices for half a century.

A command of practically unlimited resources in the concentration of manufacturing units for the production of ignition and lighting devices—of magnetos, coils, plugs and the perfection of practical instruments and methods in the development of motor cars and motorcycles, spells the reason for the newcomer in the motoring world.

Mr. Alvord, whose intimate connection with Torrington companies, producing motorcycles, bicycle and motorcycle supplies, and other organizations holding commanding positions in the supply of motorboat engines—aside from his world-wide connections in even more distinct lines of manufacturing industries—brings with him into the new company several men who are closely identified with his vast enterprises. Bryant S. Keefer has been elected treasurer of the Splitdorf Electrical Company, while Carlos W. Curtiss is secretary and general manager. John R. Viles, with Messrs. Alvord, Splitdorf, Keefer and Curtiss, will complete the board of directors.

No radical changes will be made for the present in the business which "Charlie" Splitdorf has made so famous in every section of the country and with which he retains his interests and continues his inventive and selling activities. Facilities for increasing the present hugh output of magnetos, coils and plugs are being studied by the new company and plans for the furtherance of manufacturing efficiency are at present under way, according to Sidney S. Meyers, the New York lawyer acting for the interested parties of the new corporation.

Boston "Tech" is studying motor wagon costs from actual practice, and promises some good statistics.

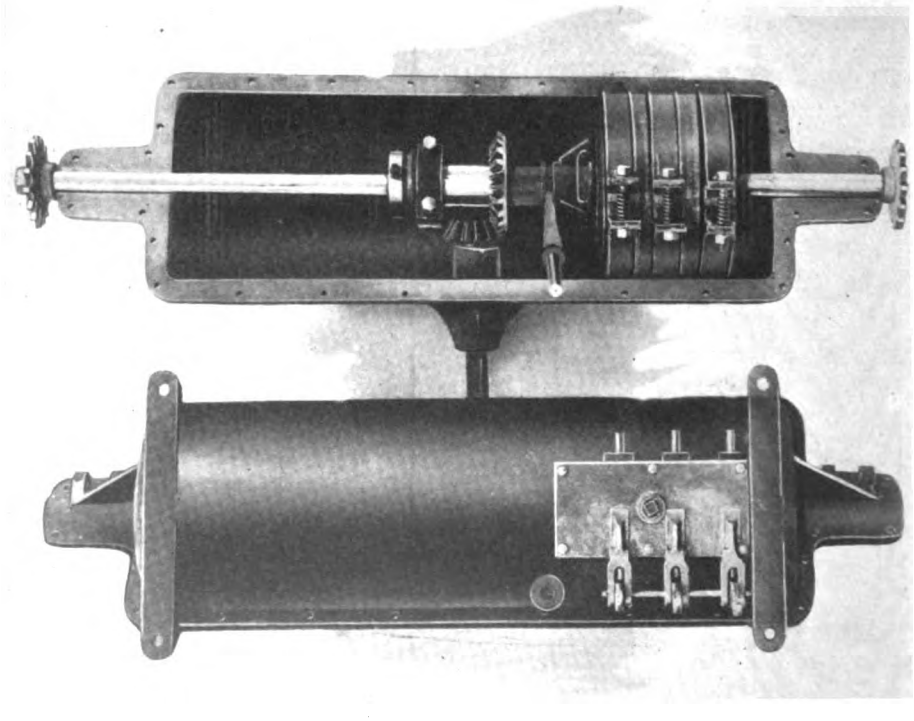
KOEHLER MOTOR WAGONS.

The Koehler motor wagon, of 1,600 pounds capacity, is attracting a great deal of attention among those who know values. It possesses unusual carrying capacity, in some cases almost double that of other machines of the same class. This machine is designed by L. E. Schlotterback, who for over ten years has been engaged in this particular line of motor car construction. His years of experience have been crystallized in the "Koehler Commercial Car," and this is a good assurance for its reliability and efficiency.

In designing the Koehler motor wagon, Mr. Schlotterback decided to specialize on the size that would be most economical and also on the design that was best adapted to that size, as well in making a machine that everybody could use and drive.

He found out which was the most reasonable method—whether light merchandise should be delivered by a heavy truck to a given point and then reloaded on smaller trucks for distribution, thus making two hauls, or whether it was more advantageous—whether it cost less—to use a number of small trucks to accomplish the same result. His investigation proved to his own satisfaction that the cheapest and best method was the use of the smaller delivery wagon. He found that it moved quicker and did just as much work at lower cost.

The next problem was what capacity would further minimize transportation charges. Mr. Schlotterback tried out the 500, 800, 1,500 and 2,000-pound capacities. The results of exhaustive tests proved that the small car of 1,600-pound capacity is



Oil-tight case in which transmission metal-to-metal clutch and gears run in a constant oil bath. (Koehler Commercial Car.)

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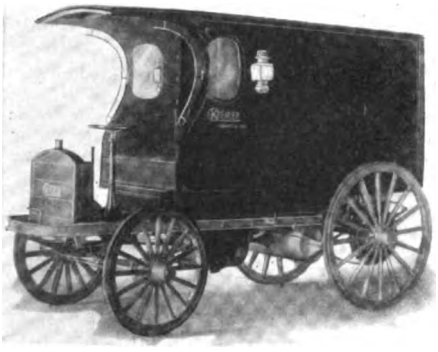
the logical machine, and for this reason—1,600 pounds is the most economical load to carry, in order to obtain the right speed, the right haul at the right price per load.

The Koehler motor wagon is built in Newark, N. J. The plant is a modern one, equipped with up-to-date facilities. The entire output is distributed by the H. J. Koehler S. G. Company, 1709 Broadway, New York city. Mr. Koehler, of course, is well known as one of the largest distributors of pleasure cars in the country. His experience in the automobile business is such that he is in a position to give his customers utmost satisfaction and he purposes to see that the "Koehler Commercial Car" gives the best of service. Profiting by the experience of other delivery wagon manufacturers, the Koehler people offer a great variety of bodies.

Mr. Schlotterback has introduced an innovation in the way of an oil-tight gear case, in which the clutch, gears and differential run in a constant oil bath.

The specifications of the Koehler motor wagon are as follows: Motor—Two-cylinder opposed, 22-24 h. p.; Cooling—Thermo-syphon system. Ignition—Bosch high-tension magneto. Control—Left hand; throttle lever on steering column. Drive—Direct line, with jackshaft; final drive from jackshaft to rear wheel sprokets through double side chains. Transmission—Planetary type; all gears chrome nickel steel, hardened throughout. Brakes—Service brakes on jackshaft; emergency brakes operated independently. Tires—Two-inch solid rubber. Capacity—1,600 pounds. Wheelbase—85 inches. Speed—Four to 16 miles per hour.



Koehler Commercial Car—Panel Type B.

IMPROVES PROPERTY VALUES.

"If I were to tell you that the motor truck has helped to rejuvenate certain pieces of real estate and place a new value on these same tracts, you would probably accuse me of making a far-fetched statement," says L. J. Fasquelle, sales manager of the gasoline division of the General Motors Truck Company. "Still, this is so, and incidentally this single feature also proves that the commercial power wagon has advantages aside from actually doing the work for which it is built.

"Take for example a section of land not adjacent to any railroads or belt lines and especially that in the outlying districts. These plats have been a drug on the market for some time and way under their real value, owing to the location and meager railroad service, and you can readily understand that those who contemplate building have to consider these shortcomings.

"The motor truck, however, has changed all this, and is used as a connecting link between these out-of-the-way territories and the nearest railway facilities. The truck has not only increased land values, but factories have been willing to locate in the outskirts to get away from the exorbitant downtown cost of property and because they were satisfied that motor trucks could take care of their hauls to the nearest shipping point."

Pierce-Arrow, 5-ton, worm-driven truck used by the Oahu Ice & Electric Co., Honolulu, Hawaii. The body on this machine has several advanced features.

BIG WAVERLEY ORDERS.

Following the recent order for 20 Waverley electric light delivery wagons from the Fleischmann Yeast Company of New York city—all of which are now in service—an order has been received for a two-ton truck from the same firm.

Now comes an order for another fleet of ten electrics on the same Waverley chassis from Mandel Brothers' department store, Chicago, and four have been ordered for Louisville.

The popularity of this "Silent Waverley" model with large users of power wagons is due in great part to the Waverley high-efficiency shaft drive, which makes the car as noiseless as any "Silent Waverley" brougham milady drives.

The questions of comparative cost of maintenance and ease of handling were promptly disposed of by competitive demonstrations and the orders followed. It is becoming now more a problem of factory space and manufacturing capacity than a sales problem with the Waverley Company. The demand for these light delivery wagons is growing every day.

A motor van in London has missed only 17 days' service in 34,000 miles of travel.

ICE WAGON FOR HAWAII.

In adopting modern business methods the people of our island possessions would appear to be fully as abreast of the times as those of this country. As an instance of this the Oahu Ice and Electric Company of Honolulu has just placed in commission a Pierce-Arrow, worm-driven motor truck of five tons' capacity which it will use in the Hawaiian city for the hauling of ice.

The body, the plans for which were made at the Pierce-Arrow factory at Buffalo, is one that has many unique features. The floor and sides to the height of 24 inches are covered with heavy zinc plate which forms a tank for catching water from the melting ice and drains it off at the front end of the body. The zinc plates are protected by wooden gratings. Protection from weather is given to the men on the truck while weighing the ice, by the extension of the top of the body in the rear. A lamp is attached to the rear for use in night work. The body is large enough to hold 36 cakes of ice of standard size.

VELIE APPOINTMENT.

F. E. Bradfield, manager of the Velie Boston branch, announces that Arthur G. Beharrell, formerly the Velie agent of Lowell, Mass., is now associated with the Velie Boston branch. Mr. Beharrell will devote his time mainly to the retail trade of Boston and vicinity.

New York state's anti-automobile bills died aborning.

Koehler Commercial Car—open flare board type.

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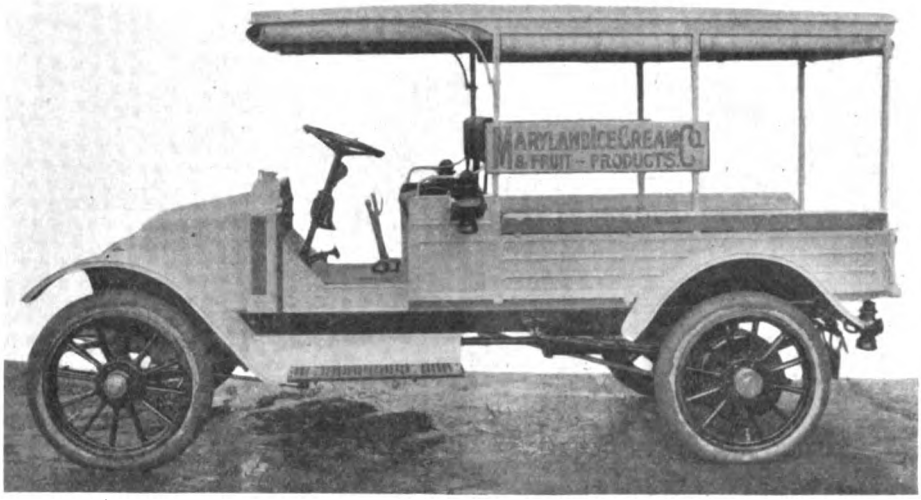


Lippard-Stewart motor wagon supplied to the Maryland Ice Cream & Fruit Products Co., Baltimore. The body is a beautiful cream color and the chassis a light brown.

CANAL HELPS INDUSTRY.

"The opening of the Panama Canal and the holding of the Panama-San Francisco Exposition next year, with their general stimulating effect on trade, are certain to increase greatly the demand for motor trucks along the coast," says E. E. Haskin, traveling sales representative of the Alco, after a four months' trip to the far West.

"Manufacturers of motor trucks and cars realize the extent of their opportunity and a number of companies had representatives on the ground during the winter.

"The oil, lumber, mining and fruit orchard industries have created a steadily growing demand for heavy duty trucks.

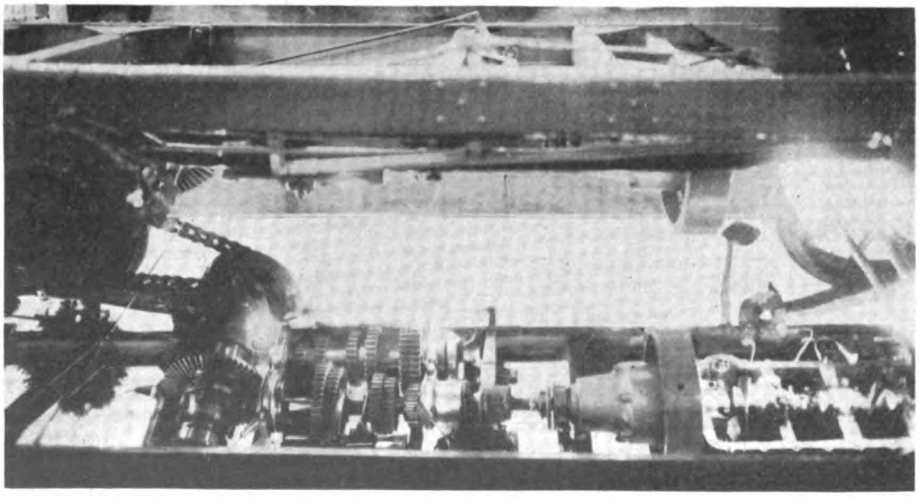
"Mining operations afford a particularly large field for trucks because here the cost of transportation by horses is excessive and railroad facilities often are inadequate. In some sections terminals are between 50 and 100 miles from the mine. Motor trucks in many instances have made a paying investment of what otherwise might be a worthless property.

"This condition has created an extensive interurban service in the West. In many of the mountainous sections where the railroads have not yet entered it is a common thing to see trucks hauling supplies along the country roads."

GOOD BUSINESS MOVE.

Hundreds of visitors are shown through the plant of the Pierce-Arrow Motor Car Company every year and the company has done what it can to make the visit an interesting one by providing guides and mapping out a route for them to follow through the factory that gives a very good idea of its extent. That it goes still further is shown by the first paragraph in the instructions to guides, which says:

"It should be remembered at all times that this company is not doing visitors a favor by showing them through the factory, and the conduct of the guides in every instance should be governed by the fact that every courtesy they show is due the visitor in return for the opportunity he gave us to show him through the buildings. The outward appearance of the visitor and whether he is apparently a prospective buyer of a car, must not be allowed to govern the conduct of the guides. A general invitation to visit the Pierce-Arrow factory has been extended to every one who may be interested, and any one coming here with a desire to see the plant is the guest of the Pierce-Arrow Motor Car Company and is to be treated as such in every respect."



A mirror was placed under the chassis of the Locomobile 5-ton truck at the recent shows, in order to show the accessibility and other good features of the mechanism. The aluminum oil pans, of course, were first removed.

"INDIANA" PROGRESS.

The Harwood-Barley Manufacturing Company, Marion, Ind., maker of the "Indiana" motor wagon, has recently established the following new agencies: R. S. Mattoon Motor Company, 2015 Michigan avenue, Chicago; Cartney Bros., 111-115 Beatty street, Pittsburgh; W. B. Pfleghardt, Charleroi, Pa.; Indiana Motor Sales Company, 2737 Cabot street, Philadelphia; Kentucky Motor Car Company, Covington, Ky., and agencies in San Francisco, Baker City, Ore., and Canada.

"Indiana" trucks are made in 1 to 1½, 2 and 3-ton sizes. They are equipped with Rutenber motors. Recent sales have been very satisfactory.

REMY SERVICE STATIONS.

In keeping with the general policy of the Remy Electric Company, Anderson, Ind., to establish service stations in all large cities, a new service station has been appointed in Buffalo, the Frey Auto Supply Company, 700 Main street, being the connection. In Columbus, Ohio, the Rogers Supply & Tire Company, Fourth and Spring streets, will be the Remy service station.

BIG ORDERS FOR G. V.'S.

On May 15 last the Chicago branch manager of the General Vehicle Company, Long Island City, N. Y., received the following significant wire from the main office:

"Adams Express orders thirty-seven more two-ton, making one hundred twenty-four ordered to date. Park & Tilford, two of three and half tons. Arnold Constable two. Lembeck & Betz, five five-tons. Jenney Manufacturing Company another five-ton. Montreal Light, Heat & Power, one. The last five of the fifty-eight American Express just delivered."

NEW SWINEHART AGENCY.

The Swinehart Tire & Rubber Company announces that it has made a very desirable agency connection in Los Angeles with the W. B. Guyton Tire & Rubber Company, 1013 South Main street. The location is in the best part of the city, and the company will have one of the best equipped and modern store rooms in Los Angeles. A complete line of Swinehart solid and pneumatic tires, including the Keaton non-skid tire, for which Swinehart has exclusive rights to manufacture in the United States, will be handled.

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G.-M.-C. DUMP BODY.

General Motor Truck Company's new automatic dumping body is receiving considerable attention by those interested in a motor truck having this mechanical, labor-saving equipment. The body is especially adaptable for carrying sand, gravel, crushed rock and asphalt. Raising of the body is done by power of the motor, transmitted through the intermediary of a gear box to the body-raising winch-drum, operated by a self-locking worm and wheel, permitting power-raising and power-controlled lowering of the body. The load can be lifted to an angle of 45 degrees in ten seconds, and the time downward is but seven seconds, so the unloading requires but a short period. The tailboard works automatically. The operating is controlled by two hand levers at the driver's seat. This type will be furnished with either the 3½ or 5-ton chassis.

GOODRICH ABSORBS DIAMOND.

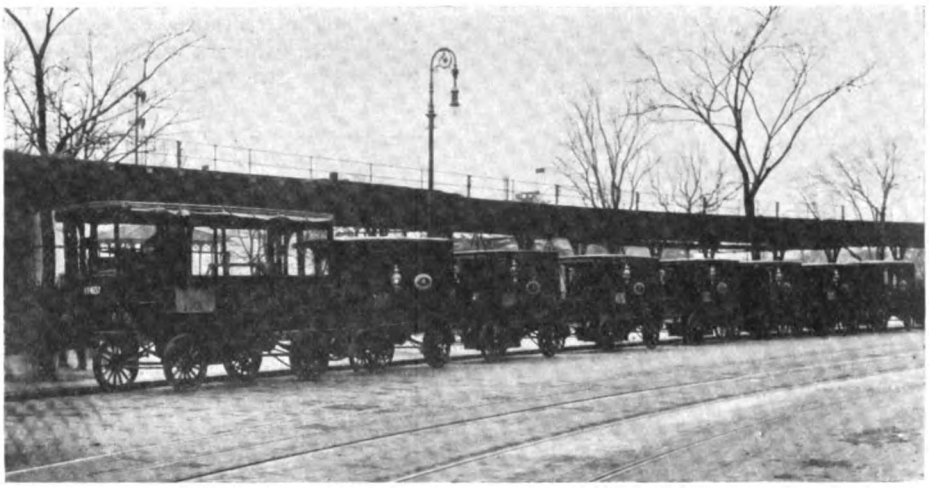
The B. F. Goodrich Rubber Company has purchased outright the Diamond Rubber Company for $45,000,000. The capital of the Goodrich Company will be increased from $45,000,000 to $90,000,000 to take care of the purchase. The capital of the new company is to be divided into $30,000,000 of preferred stock and $60,000,000 common stock.

It is anticipated that the present holders of Diamond stock will be given a divident of 50 per cent when the deal goes through, and that their Diamond stock will be exchanged for stock of the new Goodrich Company.

The proposed officers of the new company will be F. A. Hardy, of Chicago, Chairman of the Board of Directors; F. H. Mason, of Akron, Vice-Chairman of the board; B. G. Work, President of the company; A. H. Marks, Vice-President and General Manager; E. C. Shaw, Vice-President and Works Manager; H. E. Raymond, Vice-President and Sales Manager; W. B. Miller, Vice-President and Assistant Sales Manager; C. B. Raymond, Secretary; W. A. Means, Treasurer. These, together with O. C. Barber and C. C. Goodrich, will constitute the Board of Directors.

President Work, of the Goodrich Company, in talking about the deal, said: "I want it distinctly understood that we do not propose to take in any more rubber companies. The consolidation was made for the purpose of being better able to meet competition and not to stifle it. Both companies will be run separately for the time being until matters can be adjusted to better combine the two. The combination will mean a big saving in the sale of goods and the advertising."

Mr. Work further said that the branch houses in the various cities would be continued for the present, but in time will be combined, thus saving the company considerable in putting its product on the market.



Machines of the New York Edison Co. in the New York parade.

The deal was financed by Goldman, Sachs & Co., and Lehman Bros., of New York, and Kleinwort Sons & Co., of London.

One of the first effects of the consolidation will be the admittance of the stock on the Chicago Stock Exchange.

G. V. CHICAGO OFFICE.

On May 15 the Chicago office of the General Vehicle Company was moved from 417 The Rookery to the sixth floor of the Otis Building, La Salle and Madison streets, Chicago. The new office is in charge of W. W. Witherby, the new Western manager of the company, who succeeds P. C. Chrysler, Western manager, resigned.

L.-S. IN NEW YORK.

Announcement has just been made of the organization and incorporation of the Lippard-Stewart Motor Sales Company of New York, which will handle the Lippard-Stewart motor wagons in New York city. The organization is headed by T. W. Pelham, general counsel for the Gillette Safety Razor Company. Mr. Pelham has gathered around him an organization of experienced automobile men. The new concern just opened for business May 1 at 1700 Broadway. It is planning to go after the light motor wagon business on a large scale.

N. Y. E. IN N. Y. PARADE.

Of the 60 or more electric wagons in the motor truck parade in New York on April 13, eight were entered by the New York Edison Company. Six of these were G. V.'s and two were Bakers. The flagship of the fleet was the two-ton G. V. utility wagon which recently won the cup offered by the New York American for the lowest cost per mile in a two days' test for motor trucks in the city. The other seven cars were lamp wagons.

ALCO IN PHILIPPINES.

Foreign representation for the Alco has been extended to the Philippine Islands, where E. C. McCullough of Manila will handle this product.

This picture shows a 3½-ton Alco, with a novel stake body, recently delivered to Booth & Bro. by the Longstreth Motor Car Co., Philadelphia. The rod hanging from the rear end operates a windlass used for drawing ropes taut over the load of yarn and packing it down close to the body.

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THE SCIENTIFIC SIDE OF THE AUTOMOBILE.

By J. H. NEWMARK.

Few people, as they comfortably roll along in their motor cars, realize the part which science plays in the construction of the automobile. In fact, the layman lacks the power to conceive any idea of the intricate scientific analyses that must be made of all materials entering into the component parts of the present-day motor car.

The quality of cars which the manufacturer produces is in exact proportion to the amount of scientific skill and care that goes into the production. A scientific department of some sort or other is a necessary adjunct to all automobile factories. It is, however, one of the departments in which cost cutting processes must not enter, for the reason that no manufacturer can afford to trifle with the reputation for which he must rely upon the quality of his product to maintain. The more jealous he is of his reputation, the more care and the greater expense incurred in the scientific department.

To the average individual the automobile is made up of certain component parts, and it perhaps does not occur to his mind that the manufacturer must have certain knowledge of the materials, processes and ingredients that make up those various parts.

The research department of the General Motors Company is claimed to be the most exhaustive institution of its kind to be found in any automobile organization in the world. A modern definition for this department would be "a physician who keeps the product of a company in a healthy condition and free from flaws," for that is what it really does. It tests everything, no matter what it is or how trivial; the smallest and the largest items alike are carefully analyzed, and the director of research, Claude E. Cox, will, if you ask him, give you the pedigree of an axle for a five-ton truck or the ingredients making up a harmless looking grease.

The functions of this department are many and important. It must first of all keep in touch with modern engineering methods; it must know the prevailing practice in motor car construction in this country and abroad. It must know the good and the bad, and it must give its reasons for it. The "because" of a certain thing won't go. A visit to this chemical laboratory is really educational, for one is surprised to learn the many thousands of dollars spent each year in experimenting and perfecting machinery. You will see testing machines having the strength to pull apart a piece of steel that would support a hundred-ton load. You look at it with the feeling that you would trust your life in a five-passenger touring car equipped with an axle that had undergone this severe test.

At the present time the department is investigating and testing, secretly, a new steel, which, from the advance examinations made, will not only create a new standard for strength, but at the same time lessen the cost of production. No tests are so severe as given this fundamental constructive metal, for steel, today, is the basis of all machinery building. It is not only chemically analyzed, but physically tested. The tensile and torsional strength are minutely ascertained. Sample steel is made, remade, and heat-treated, and undergoes every other laboratory test known to science.

Innocent looking bearings, but so vitally important in motor car construction, are subjected to grueling tests. As a preliminary they are put in a revolving machine and turned several million times to note the wear, if any. They are then placed in experimental motor cars and used under normal conditions. After this the bearings are broken up, analyzed and placed under a miscroscope for observation.

Motors are tested by dynamometers. By this method the brake-horsepower is known; the compression of the motor is also noted; the quantity of gasoline consumed, and the working of the lubricating system. All of these tests and many others are made.

Subsidiary companies of General Motors send their samples to this central laboratory for testing and reports are sent back. If changes are necessary, they are so recommended, and, of course, incorporated, and no important unit is adopted until it has been agreed upon by both the laboratory and the engineers of the company desiring to use the particular part. The department is at the present time engaged in perfecting a device for ascertainng the horsepower of motors. This is meant to be a check on the block test, but the result will be arrived at in an entirely different way, for it is an instrument to be equipped on the car.

The work of the department is so comprehensive and the facilities are such that it is in a position to test rigidly and correctly an entire motor car and ascertain to a nicety just what is to be expected of it and the mechanical efficiency it represents.

The museum is one of the interesting places in the laboratory. Here you find samples—samples of carburetors; samples of steel, cables, transmissions, nuts and bolts, magnetos, shafts and bars, and long rows of bottles containing oils and greases. Please remember that all these samples have been tested and their mechanical effiiciency and physical properties are known. Even the greases and oils come in for a certain amount of attention, for they are allowed to age and settle. Should a salesman come in and make claims regarding his particular oil and how it will keep, and describe its appearance after a specified period, he will be told by the manager, who has kept a record of this particular brand, just what the conditions are and whether the product is living up to the claims made by the manufacturer. A paint expert is also engaged, whose business it is to analyze the different grades and ascertain the wearing qualities under severe conditions.

General Motors records are also kept here, blueprints of every car made, and catalogs and specifications for different years are to be found.

The library in connection contains all engineering works published in the last half century, by authorities both here and abroad, and references, technical works and other journals devoted to the industry are filed.

The assistance thus given to General Motors subsidiaries is invaluable. It eliminates doubtful practice, all of its recommendations are founded on severe tests and no chances are taken. It is figured that the consumer is the ultimate gainer, for this extra precaution is an insurance to him that the manufacturer has built a car which embodies the best principles and has incorporated only that which he has found to be true and lasting.

COMPLIMENT TO REMY.

Dr. L. H. Baekeland, the discoverer of "bakelite," recently visited the plant of the Remy Electric Company, Anderson, Ind., to inspect the new installation of the machinery for the manufacture of bakelite parts used in the insulation of electric currents in the Remy magnetos.

The famous inventor assured General Manager H. W. Griffith that the facilities of the Anderson factory to manufacture bakelite products for magnetos surpassed any other installation of this machinery in any factory in the United States of America, and complimented the factory manager, H. E. Krause, on the high grade of work that was being turned out under his supervision. So far as is known, the Remy Electric Company is the first to use this synthetic insulating material known as bakelite in the manufacture of insulating parts for magnetos.

WORMAN'S NEW WORK.

H. A. Worman, formerly advertising manager of the National Carbon Company of Cleveland, became associated in the same capacity, May first, with the Baker Motor Vehicle Company of Cleveland. Mr. Worman is well known both by his magazine articles on advertising and selling, and for his constructive work in those lines with the Addressograph and International Harvester companies of Chicago. After leaving college, Mr. Worman associated himself for a period of five years with the National Cash Register Company. Since coming to Cleveland he has become closely identified with the development of classes in sales and advertising in connection with Y. M. C. A. work. He is a forceful, convincing lecturer and writer on the subject of his profession.

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CLASSIFIED ADVERTISING.

SALESMAN WANTED—A producing salesman for auto trucks. Must be a man of character, and one that has gotten results. We have the easiest selling proposition on the market today, from the standpoint of a superior article for less money. Address G. F., % The Power Wagon.

WANTED—Two or three commission men to establish agencies on a new 1½-ton motor truck being manufactured by an old established firm of ample resources. Address B, % The Power Wagon.

WANTED—Competent experienced business manager for Auto Truck Factory established three years and doing good business. Three up-to-date 4-cylinder models. Must interest himself financially. Good salary and percentage of net profits. Splendid opportunity for right man. Address H. F., % The Power Wagon.

MOTOR TRUCK makers who desire their product marketed in a way which will individualize it and result in a strong and enduring business are invited to write to the address below. No proposition will be considered unless trucks are of advanced design, and the backers appreciate the value of specialized experience. Will also consider proposition to act as general manager. Address P. S. F., % The Power Wagon.

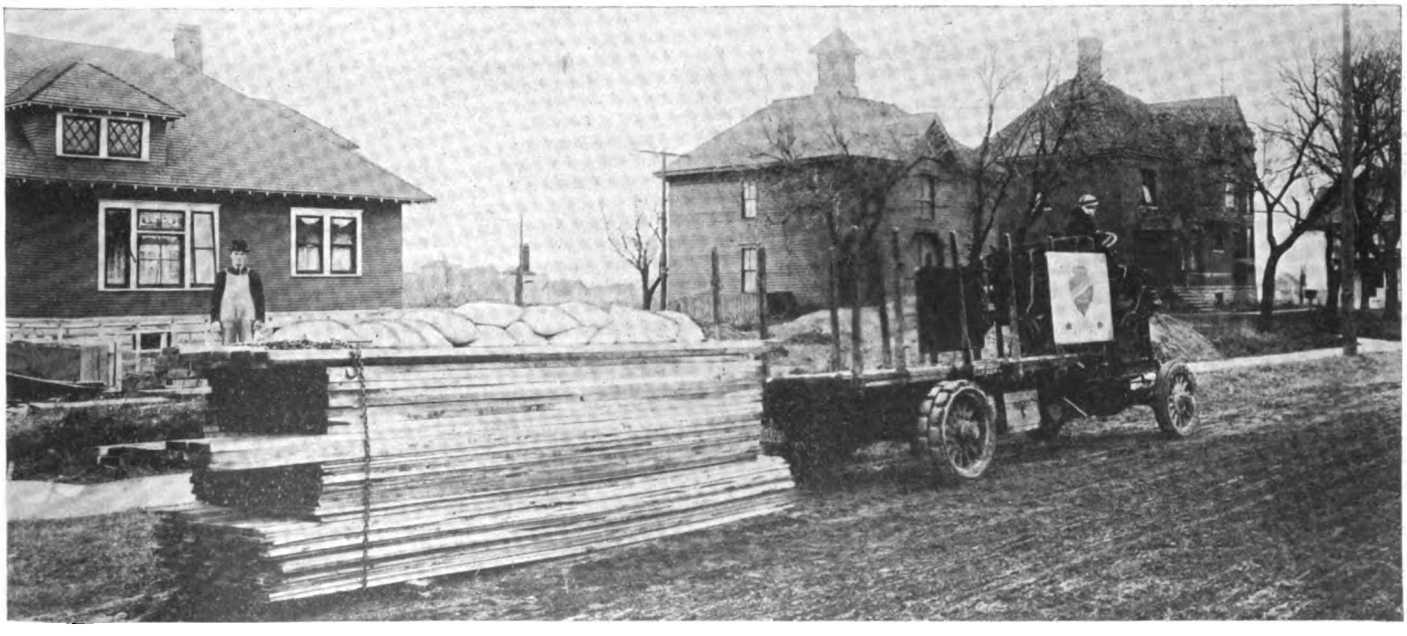
MANUFACTURER of well known high grade automobile, about to place motor trucks on market, has opening for several engineering salesmen competent to take charge of Truck Department at its branches as business develops. Selling ability and mechanical knowledge essential. Exceptional opportunity for men of proper caliber. State experience, references, salary desired, age, married or single. Address R. S., % The Power Wagon.

BARGAINS in high-grade panel-top delivery bodies with doors in rear. We have a quantity to close out, $70 to $100. Write for prints and particulars. The Barndt & Johnston Company, Columbus, Ohio.

The International Motor Company had an interesting exhibit at the convention of the National Hosiery and Underwear Manufacturers recently held in Philadelphia.

The Philadelphia agency of the Alco—the Longstreth Motor Car Co.—has been obliged by its increasing business to seek larger quarters. A modern concrete building on Market street will be occupied by this concern on September 1.

Many Macks and Saurers are being sold in Denver, Colo. A recent order called for three machines for hauling shelled peas from the various hulling plants to the main canning factory. The canning season lasts only 45 days in the year.



Typical scenes showing economical use of motor wagons in handling lumber.

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RETROGRESSIVE MINNEAPOLIS.

Dr. P. M. Hall, health commissioner of Minneapolis, has gone on record against the use of motor wagons for garbage haulage, such as are used in Atlanta, Ga.

"It may be all right," said Dr. Hall recently, "but also it is expensive and not practical. I fear the people of Minneapolis and perhaps some of the aldermen would set up an awful howl if the council bought automobiles for garbage collection."

Which makes one wonder if they teach economics, progression and common sense (which evidently is not so very common, after all) in the school where the doctor obtained his degree.

ANOTHER MOTOR EXPRESS COMPANY.

Lynn and Swampscott capital is said to be involved in a proposed new motor express company which will operate between Lynn, Swampscott and Boston.

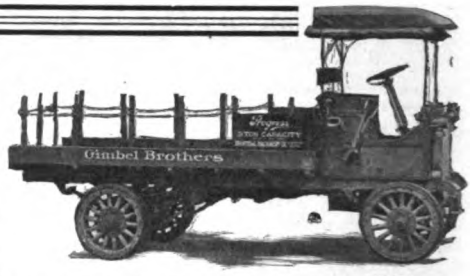
The exact plans of the promoters are not known at the present time, but it is believed that their equipment will include two large motor trucks and one small delivery wagon, the latter for local delivery.

CO-OPERATING WITH BOAT SERVICE.

A recent dispatch from Suisun, Solano county, California, states that motor truck transportation from Suisun to Vacaville has begun. The boat service from the city tri-weekly to Suisun connects with these trucks and gives shippers of Vacaville and Winters quicker and cheaper service.

"Progress" Motor Trucks

1½ and 3 Tons Capacity



These models are as near fool-proof as it is possible to make them. We build them in their entirety in our own plant. They are not assembled from parts purchased on the market. They represent high class engineering and manufacturing experience. We have territory for responsible dealers.

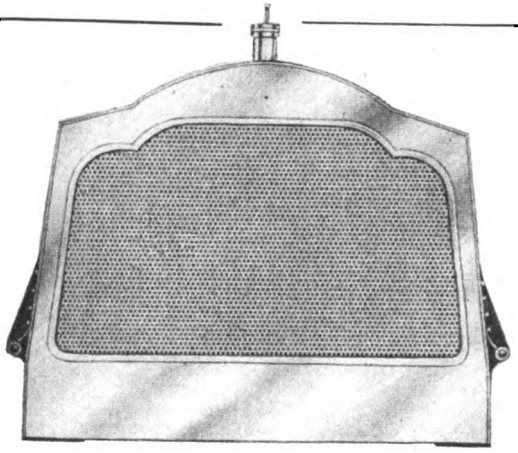
Write for Catalog and Proposition.

Universal Machinery Co., MILWAUKEE, WIS.

FEDDERS

Real Square Tube Radiators

¶ Commercial cars require radiators that will stand many shocks and much hard usage. This was one of the weak parts of the commercial car but the test of time has proved that FEDDERS radiators render efficient service.



¶ We want to figure with you your requirements for the coming season. If you haven't used Fedders radiators you probably have had a great deal of radiator trouble and you may think that their isn't a radiator built that will give you satisfaction. If this is the case we would like to have an opportunity of demonstrating that the Fedders radiator will stand the wear and tear and shocks of the commercial car and that manufacturers who equip their commercial cars with the Fedders have practically no radiator trouble. We can convince you. Will you give us the opportunity?

FEDDERS MFG. WORKS

BUFFALO :: NEW YORK

The "DART" $750 after May 1.

It's because we are making the new 1912 DART so much better. It's because we are using Parson's white brass and Hyatt bearings in the wearing parts. Because we are using heavier jack shafts, heavier springs, stronger tortion rods, and larger tires.

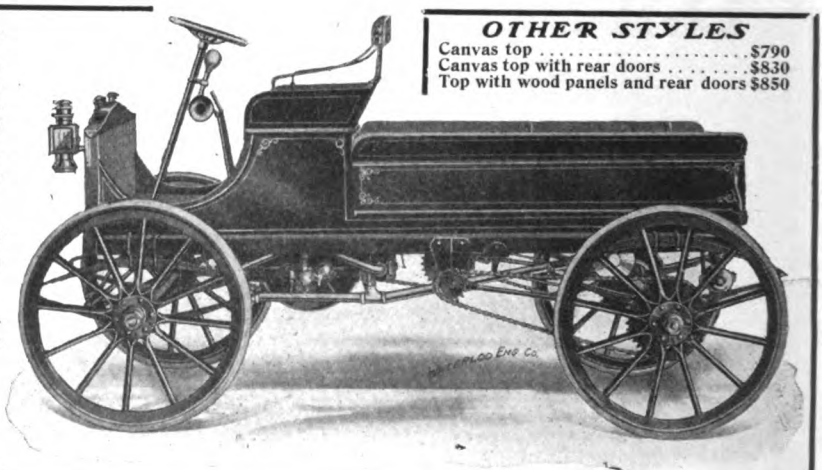
It's because of these and other improvements that we must increase the price of DART trucks to $750 after May 1, 1912.

From our agents everywhere are coming letters of commendation on our action. Quality tells in time and we're looking out for the future.

Write today for a free booklet. Better yet, write for our agency proposition.

The Dart Manufacturing Co.

Dept P. W. WATERLOO, IOWA



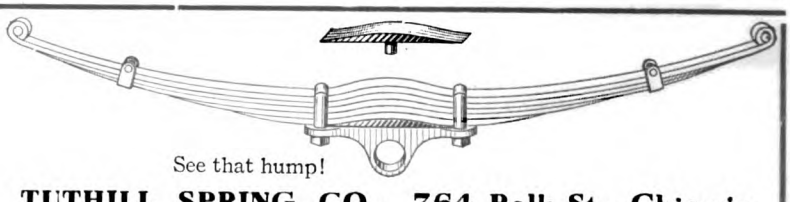
OTHER STYLES

Canvas top $790
Canvas top with rear doors $830
Top with wood panels and rear doors $850

TITANIC SPRINGS

Tougher than Vanadium—Cheaper than Vanadium

Neither NIB nor HOLE in center to hasten a break. Thirty years' experience enables us to make the best springs made. Let us be of service to you.



See that hump!

TUTHILL SPRING CO., 764 Polk St., Chicago

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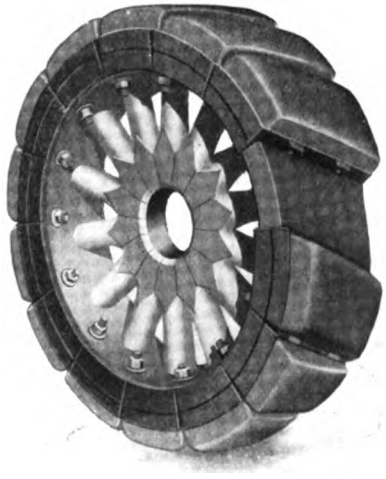
Six Reasons Why

DIAGONAL BLOCK TIRES

Give the greatest mileage and most effective service at the lowest cost per tonnage mile of any tire on the market.



Showing Block Removed

First——The simplicity of the fastening of blocks enables your truck driver to take care of any replacements that may be necessary, at any time and at any place, without even jacking up the wheel.

Second—In making replacements you lose only a fractional part of your investment instead of a whole tire

Third —The independent block feature eliminates heat and allows for rubber displacement, thus insuring greater mileage.

Fourth—Diagonal blocks grip the road with the same sure pull as the cleats on a traction engine. Result—greater traction.

Fifth——The diagonal placement of blocks gives a continuous rubber surface on the ground, thus giving the smooth roll of the endless tire.

Sixth——Diagonal blocks prevent skidding and do away with the necessity for chains.

Exclusive selling rights still open in a few cities.

WRITE TO-DAY FOR BOOKLET

THE DIAGONAL BLOCK TIRE CO., - Urbana, Ohio

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CLASSIFIED BUYERS' GUIDE.

Prepared for the convenience of buyers of motor wagons, parts and equipment. All the concerns listed under the various headings advertise regularly in the "Power Wagon."

AUTOMATIC MACHINERY.
Cleveland Auto Machine Co., Cleveland, O.

AXLES.
Driggs-Seabury Ordnance Co., Sharon, Pa.
Sheldon Axle Co., Wilkes-Barre, Pa.
Timken-Detroit Axle Co., Detroit, Mich.
Torbensen Gear & Axle Co., Bloomfield, N. J.
Weston-Mott Co., Flint, Mich.

BEARINGS (Ball).
Barthel, Daly & Miller, New York City, N. Y.
Bretz, J. S., Co., New York City.
New Departure Mfg. Co., Bristol, Conn.
R. I. V. Co., New York City, N. Y.

BEARINGS (Roller).
Bower Roller Bearing Co., Detroit, Mich.
Hyatt Roller Bearing Co., Detroit, Mich.
Timken Roller Bearing Co., Canton, Ohio.

BRAKE LINING.
Johns-Manville Co., New York City, N. Y.
Woven Steel Hose & Rubber Co., Trenton, N. J.
Royal Equipment Co., Bridgeport, Conn.

CARBURETORS.
Zenith Carburetor Co., Detroit, Mich.

CASTINGS.
Jewell Steel & Malleable Co., Buffalo, N. Y.
Wetherill Finished Castings Co., Philadelphia, Pa.

CHAINS.
Baldwin Chain & Mfg. Co., Worcester, Mass.
Culver-Taylor Chain Works, Detroit, Mich.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Sarco Engineering Co., New York City, N. Y.
Whitney Mfg. Co., Hartford, Conn.

CLUTCHES.
Merchant & Evans Co., Philadelphia, Pa.
Otto Konigslow Mfg. Co., Cleveland, Ohio.

CONTROL LEVERS.
Otto Konigslow Mfg. Co., Cleveland, Ohio.

DIFFERENTIALS.
Cullman Wheel Co., Chicago, Ill.
Ross Gear & Tool Co., Lafayette, Ind.

DROP FORGINGS.
Park Drop Forge Co., Cleveland, O.
Western Drop Forge Co., Marion, Ind.
J. H. Williams Co., Brooklyn, N. Y.
Billings & Spencer, Hartford, Conn.

ELECTRIC CURRENT.
Commonwealth Edison Co., Chicago, Ill.

ELECTRIC MOTORS.
Westinghouse Electric & Mfg. Co., Pittsburgh, Pa.

ELECTRIC WELDING.
Standard Welding Co., Cleveland, O.

ELECTRIC WAGONS AND TRUCKS.
Anderson Electric Car Co., Detroit, Mich.
Baker Motor Vehicle Co., Cleveland, Ohio.
Couple Gear Freight Wheel Co., Grand Rapids, Mich.
General Motors Truck Co., Detroit, Mich.
General Vehicle Co., Long Island City, N. Y.
Joliet Auto Truck Co., Joliet, Ill.

FOOT PEDALS.
Otto Konigslow Mfg. Co., Cleveland, Ohio.

GASOLINE ENGINES.
Continental Motor Mfg. Co., Muskegon, Mich.
Hazard Motor Mfg. Co., Rochester, N. Y.
Palmer-Moore Co., Syracuse, N. Y.
Syracuse Gear Co., Syracuse, N. Y.
Western Motor Co., Marion, Ind.
Wisconsin Motor Mfg. Co., Milwaukee, Wis.
Waukesha Motor Co., Waukesha, Wis.

GAS-ELECTRIC WAGONS AND TRUCKS.
Couple Gear Freight Wheel Co., Grand Rapids, Mich.

GASOLINE STORAGE OUTFITS.
Air Tight Steel Tank Co., Pittsburg, Pa.

GASOLINE WAGONS AND TRUCKS.
Adams Bros. Co., Findlay, Ohio.
Alden Sampson Mfg. Co., Detroit, Mich.
American Locomotive Co., New York City.
Available Motor Truck Co., Chicago, Ill.
Avery Company, Peoria, Ill.
Bessemer Motor Truck Co., Grove City, Pa.
Bowling Green Motor Car Co., Bowling Green, Ohio.
Buckeye Mfg. Co., Anderson, Ind.
Chase Motor Truck Co., Syracuse, N. Y
Commerce Motor Car Co., Detroit, Mich.
Commercial Motor Vehicle Co., Chicago.
Dart Mfg. Co., Waterloo, Ia.
Federal Motor Truck Co., Detroit, Mich.
General Motors Truck Co., Detroit, Mich.
Gramm Motor Truck Co., Lima, Ohio.
Grand Rapids Motor Truck Co., Grand Rapids, Mich.
Harwood-Barley Mfg. Co., Marion, Ind.
Henry Lee Power Co., Chicago.
Ideal Auto Co., Fort Wayne, Ind.
International Motor Co., New York City, N. Y.
Jarvis Huntington Automobile Co., Huntington, W. Va.
Kissel Motor Car Co., Hartford, Wis.
Koehler, S. G., Co., New York City, N. Y.
Knickerbocker Motor Truck Mfg. Co., New York City, N. Y.
Knox Automobile Co., Springfield, Mass.
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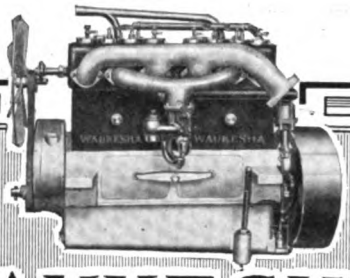

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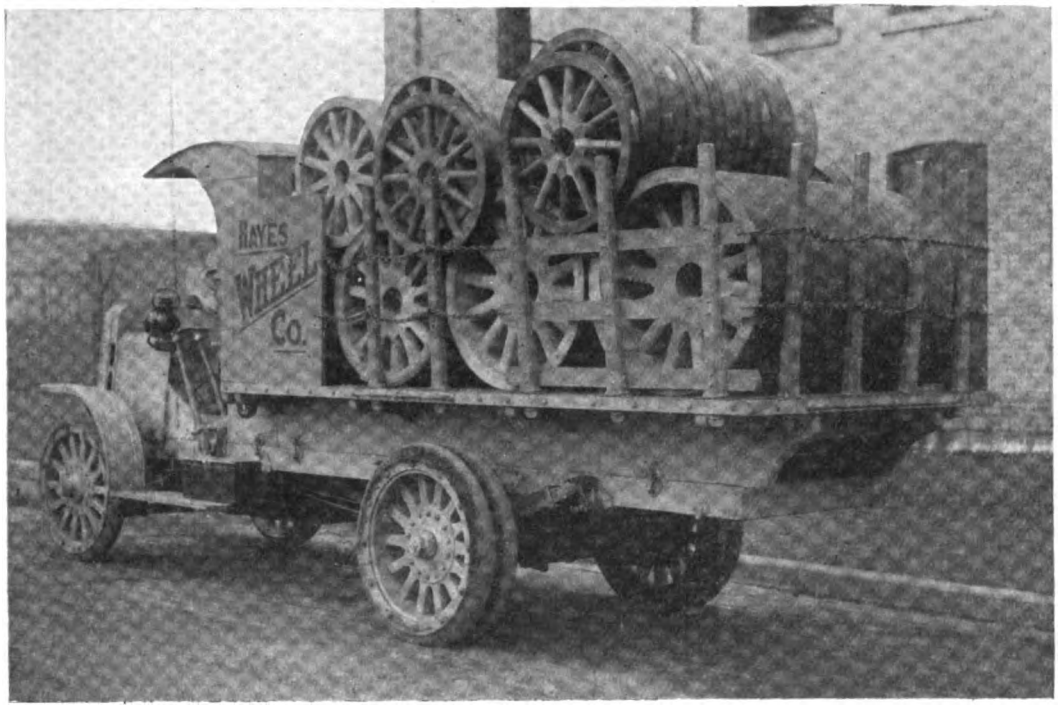

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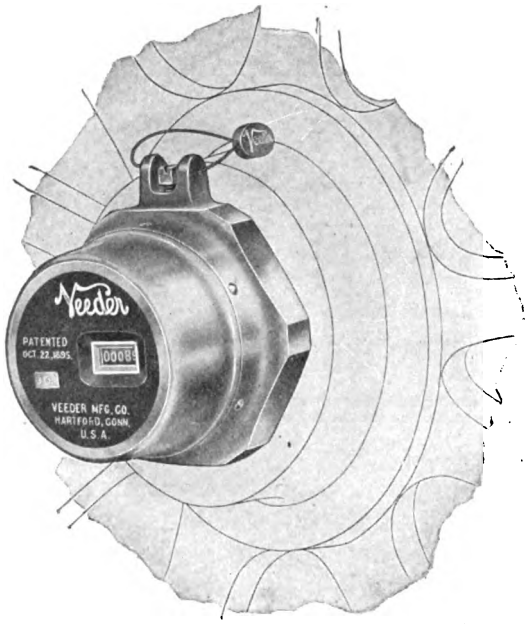
Did you ever pause to consider how false and misleading motor wagon operating costs may be if they are not founded upon accurately recorded mileage? Mileage is one of the two fundamentals in transportation accounting; the other is tonnage. Mileage and tonnage indicate vehicle work performance.

Enlightened motor wagon owners are at unusual pains to get the detail of operating cost. They know from experience that if the mileage is not precisely recorded errors in accounting will ensue which, in large installations, are so serious as to jeopardize the investment.



To be specific: If each unit in a fleet of 50 three-ton machines is supposed to travel 40 miles a day, and the tire cost is calculated at 4 cents a vehicle mile, there is a theoretical daily tire cost of $1.60 a day per unit, or a total daily tire cost of $80. Working 300 days a year the annual tire cost of the fleet will be $24,000. Now suppose there is no check on the mileage, and in practice it develops that it is over-calculated by 10 per cent—a very common occurrence in the case of machines not provided with recording instruments. In this situation the daily service of each machine is 36 miles and an excess daily tire charge of $8, or $2,400 annually must be borne by the general economy of the fleet. If on the other hand, the unrecorded daily mileage is under-calculated by 10 per cent—which also happens with surprising frequency—the daily service of each unit of the fleet is 44 miles and the annual tire cost is $2,400 more than anticipated.

Of course accounting errors of proportionate importance will also happen in other items of operating expense—such as fuel and lubricant—if mileage is not measured, until the whole scheme of accounting becomes so artificial in character as to be worthless. It is of equal importance to note that it is beyond the skill of any motor wagon transportation expert to assign a proper charge for depreciation—which in the best practice is wholly based upon mileage—unless the work performance is accurately measured.

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only by fitting each machine with a Veeder Hub Odometer. This instrument will check distance traveled backward as well as forward. There is no way of falsifying its record. It unfailingly aids in supplying motor wagon operating cost down to the nicest detail. Without it transportation accounting can only be accomplished in a slovenly, amateurish manner.

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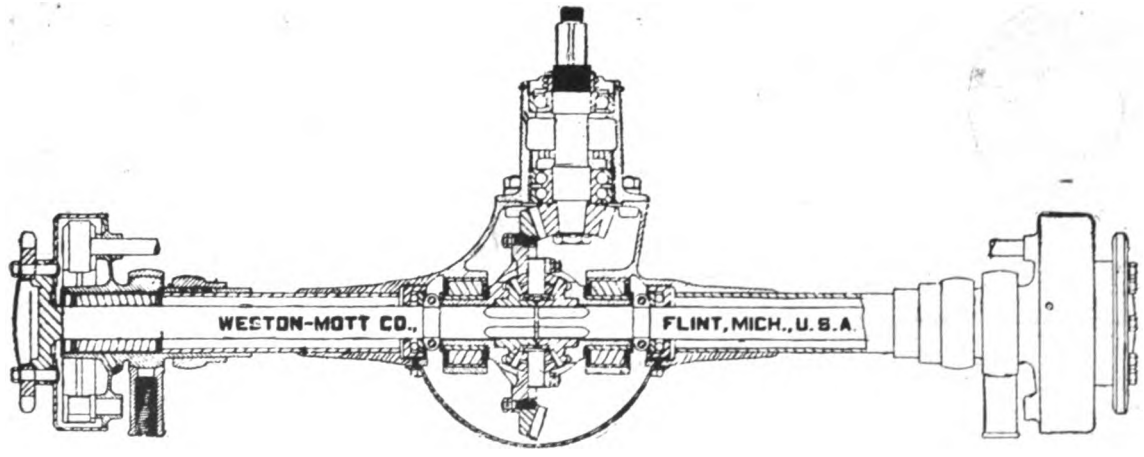

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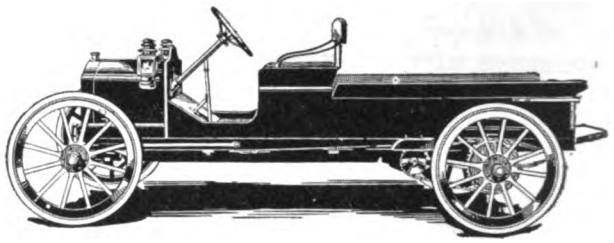

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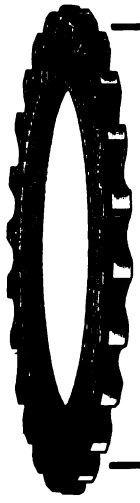

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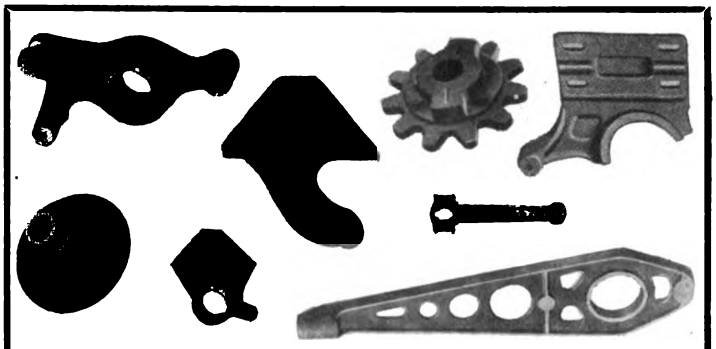

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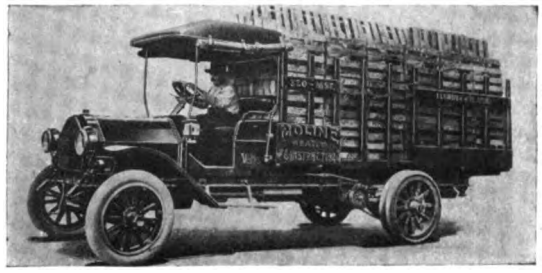

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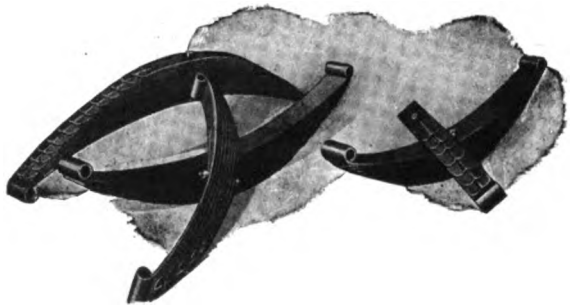

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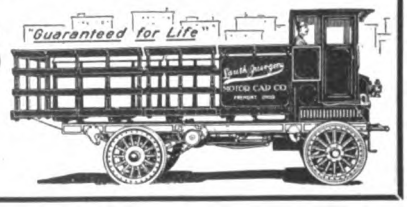

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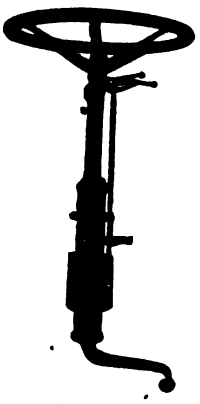

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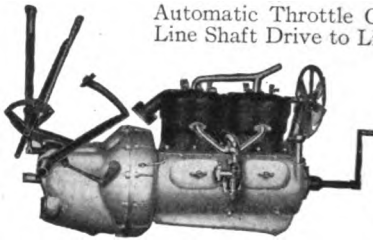

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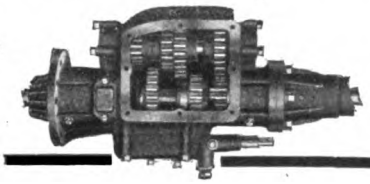

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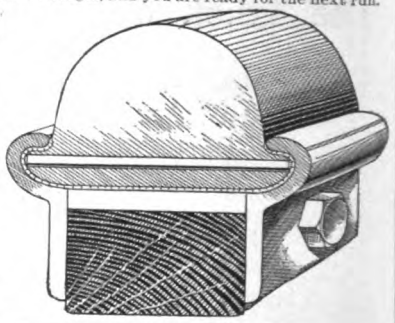
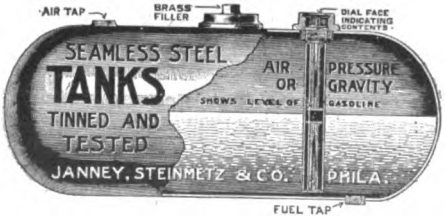


Motor Truck Tanks



Strong, Sturdy, Safe and Leakless

GASOLINE TANKS—ALL SIZES IN STOCK. Compressed Air Tanks—for Motor Starters. New Catalogue Now Ready. —WRITE US

Janney, Steinmetz, Philadelphia

The Quality That Gives Service ::

Capacity 1500 Lbs.

Let us quote prices with a body built to fit your business.

Price $975.00 with 2½ inch Tires.

AVAILABLE TRUCK COMPANY
2334 Hamilton Court, :: Chicago, Illinois

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PRESSED STEEL
FRAMES
FOR TRUCKS

A. O. SMITH COMPANY
MILWAUKEE

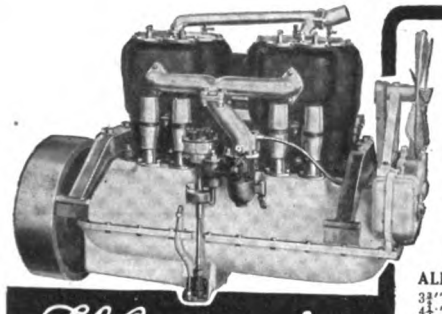
WETHERILL FINISHED CASTINGS CO.
BABBITT—ALUMINUM—BRASS
DIE CASTINGS

including all well known Babbitts, Aluminum Alloys, Brass and Bronze Compositions as well as all Zinc and Tin Base Metals.

SAND CASTINGS

of any material, including Cast Iron, Bronze, Brass, rough or finished. Manufacturers of Automobile Parts, Water Pumps, Oil Pumps, Carburetors, Etc., Dies and Light Machinery.

WETHERILL FINISHED CASTINGS CO.
Erie Ave. and Richmond St. PHILADELPHIA, PA.



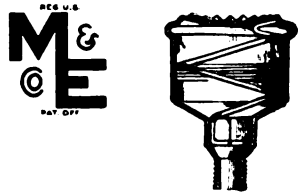
SUPERIOR FEATURES
Large Bearings
Perfect Lubrication
Double Ignition
Heavy Crank Shaft
Large Valves
Ample Water Jacket
Perfect Workmanship
Long Stroke

ALL 4 CYCLE—IN 5 TYPES
3¾" bore, 5 " stroke, 4 cyl.
4½" bore, 5 " stroke, 4 cyl.
4½" bore, 5 " stroke, 6 cyl.
4½" bore, 5½" stroke, 4 cyl.
5¼" bore, 7 " stroke, 4 cyl.

Wisconsin Long Stroke Motors

WISCONSIN MOTOR MFG. CO. Dept. 31
Milwaukee, Wis.

"M. & E." GREASE CUP



In this cup an interior coil spring, fixed in the hex base, ratchets against radial corrugation—or interruption—in the adjustable cover. It is the simplest, cleanest in and out, most compact, surest and best grease cup in the market today. Adopted on all 1912 "Pierce-Arrow" Trucks, and many others.

MERCHANT & EVANS COMPANY
PHILADELPHIA
New York Chicago Brooklyn Kansas City Baltimore Denver

W. H. McIntyre Co.
Vehicle Builders Since 1869
AUBURN, INDIANA

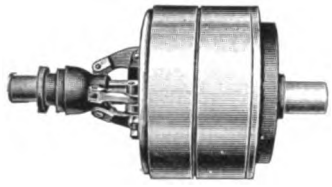
McINTYRE All Steel Chassis

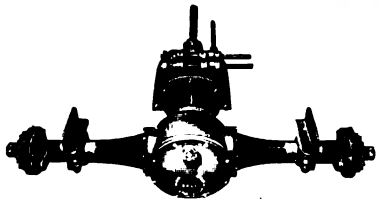
100% Road Score CUP WINNER 100% Technical Score
First Annual Commercial Car Contest of Chicago Motor Club, September, 1911.

Capacity—600 lbs. to 6,000 lbs.

NEARLY HALF A CENTURY OF VEHICLE BUILDING
Write for Agency TODAY 1101 West 7th Street AUBURN, INDIANA

BALL PATENT PLANETARY TRANSMISSION and JACK SHAFTS





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New York Gear Works
58 Greenpoint Avenue
Brooklyn, N. Y.

One large user wrote

"We carry these grips on our machines at all times and in a number of cases have found use for them. On any of these occasions we would have been seriously delayed if we had not had your grips, and we consider these grips have already paid for themselves."

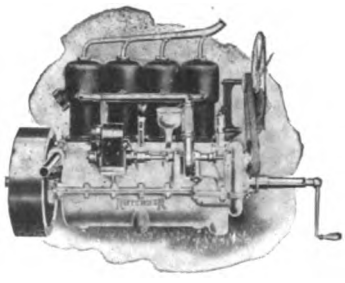
A set on **your** car insures you against traction troubles.

Catalogue on request

ATLAS CHAIN COMPANY
Bush Terminal———Brooklyn, N. Y.

All Roads Are Level

to the truck that places its reliance upon



THE RUTENBER MOTOR

This is the motor that is built for service, speed and silent performance. It cuts your motor costs in half and doubles your efficiency. Write for the record of this motor and for list of power trucks carrying the RUTENBER.

THE WESTERN MOTOR CO., - Marion, Ind.

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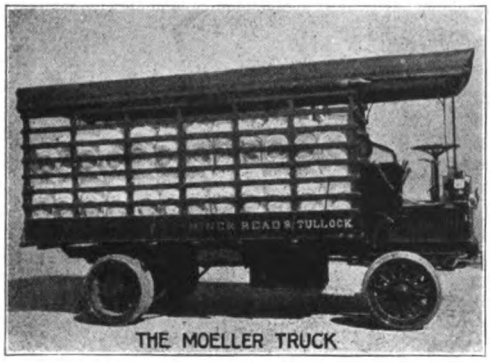
TRUCK-SPRINGS

Auto-Trucks, Fire Apparatus and Commercial Vehicle Springs
combining
MAXIMUM OF ENDURANCE with MINIMUM OF VIBRATION
Made to order of Special Heat-Treated Alloy Steel

SPRING PERCH CO. Bridgeport, Conn.



MOELLER Motor Trucks

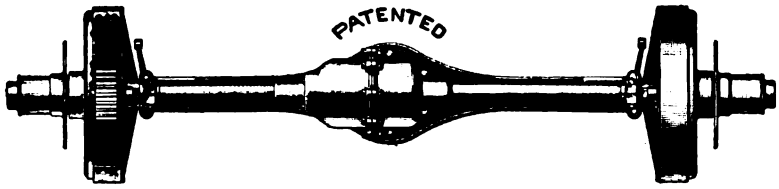
"A BUSINESS PROPOSITION"

Write for catalogue and literature today
showing cost of operation and maintenance

Not a Better Built Truck in America

Manufactured and Guaranteed By
THE NEW HAVEN TRUCK & AUTO WORKS, New Haven, Conn.

Size, 1500 lbs. to 3 tons.

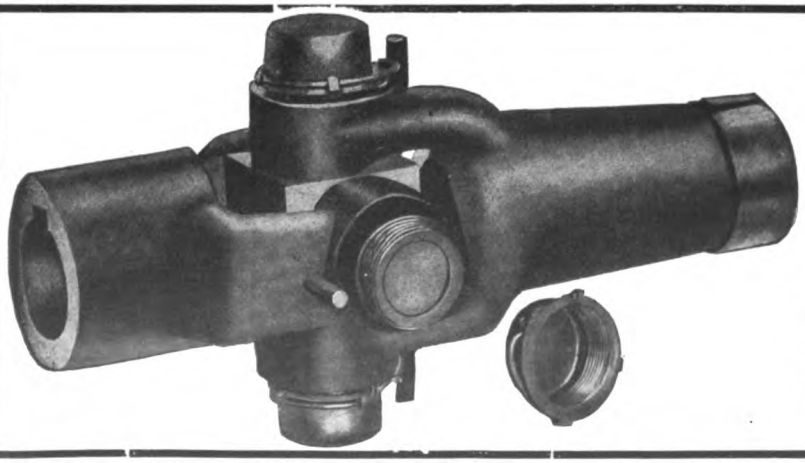


Size, 1500 lbs. to 3 tons.

Torbensen Internal Gear Truck Axle

Torbensen Gear & Axle Company

Bloomfield, N. J.



BLOOD BROS'. UNIVERSAL JOINTS

Style A, made for all sizes of shafts up to 3 inches.

Strongest and most durable joint for motor trucks. Used for years as a regular equipment on many of the best makes of trucks.

BLOOD BROS. MACH. CO., Manufacturers
Kalamazoo, Mich.

Please mention the "Power Wagon" when writing to advertisers.

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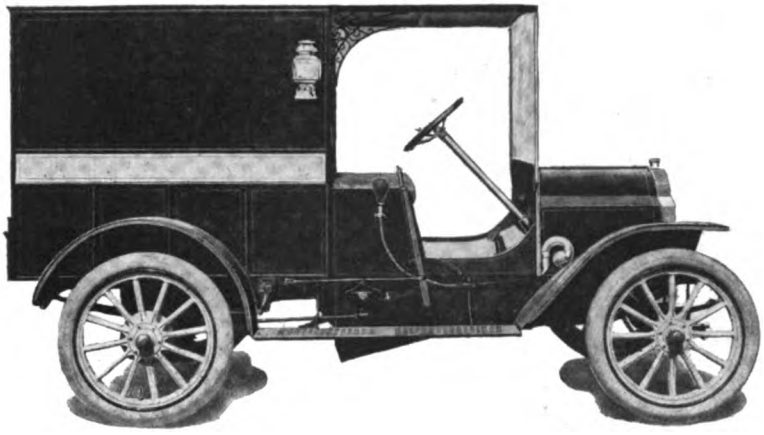
Here Is the 1912 Sensation of the Motor World



Panel Body; Four Cylinder, 20 H. P. Motor; Bosch High-Tension Magneto; Pneumatic Tires, 32x3½ Inches—Price Complete, $850.00. Solid 2½ Inch Truck Tires—Price Complete, $800.00.

COMMERCE CAR

Designed for the delivery of 1,000 pound loads at *minimum operating cost* and *low initial investment*

Bad roads and steep hills have no terrors for the "Commerce"

WE HAVE SOME CHOICE TERRITORY LEFT FOR GOOD, ACTIVE DEALERS

Write for Catalog

The Commerce Motor Car Company

General Office: 634-640 Penobscot Bldg. - Detroit, Michigan

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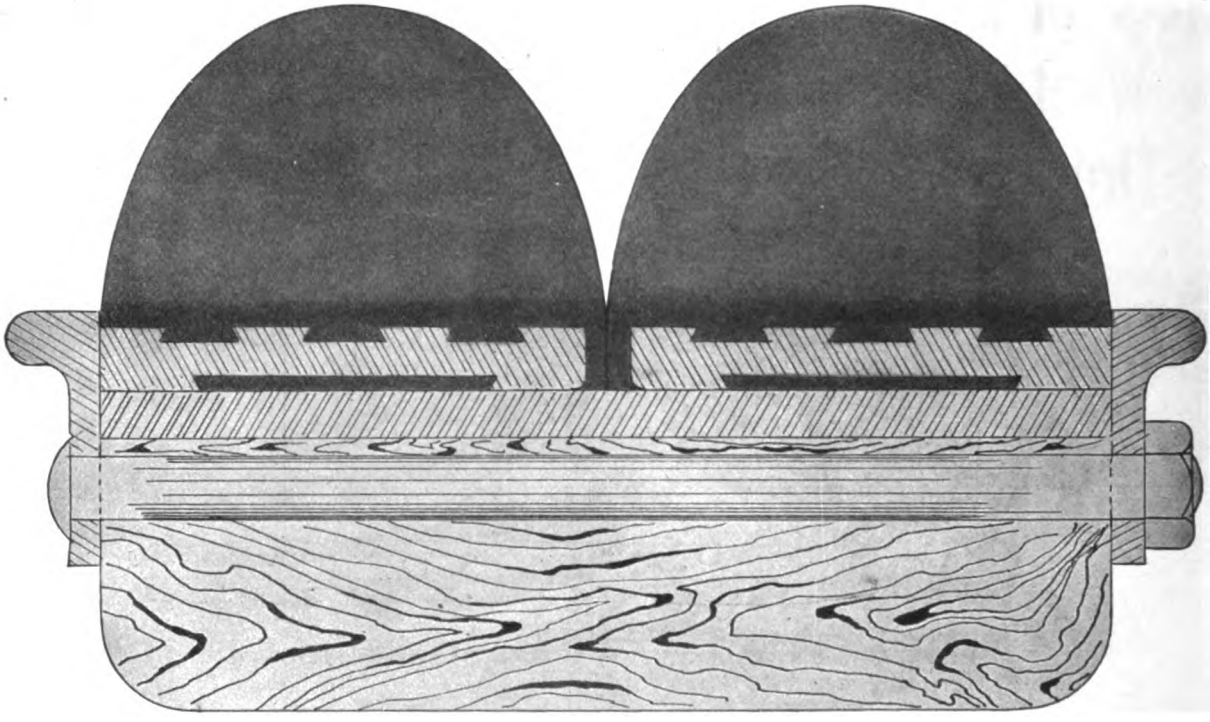

10,000 MILES
CONTINUOUS SERVICE

POLACK TYRES give a greater continuous mileage than any other truck tyre manufactured.

POLACK TYRES have the maximum resiliency and will reduce your expense for mechanical repairs.

Use them on your Electric Truck and increase its battery efficiency, and thereby the radius of operation.

Use them on your Gasoline Truck and keep it on the road earning money, instead of in the repair shop losing money.

Polack Tyre & Rubber Company

Main Offices:
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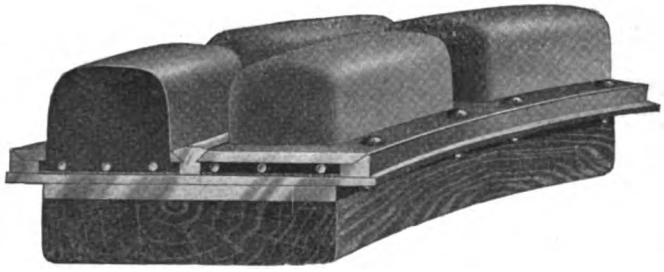
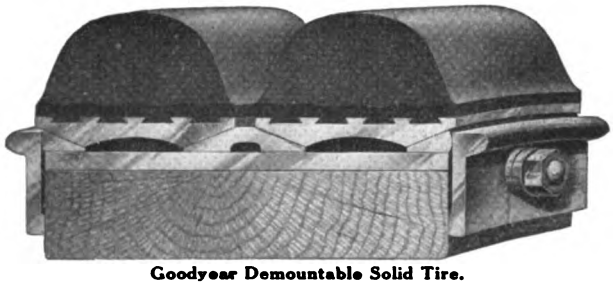
Owners of Motor Trucks—See What GOODYEAR 1912 AKRON, OHIO Tires Save You!



Goodyear Individual Block Tire.

IF you have a heavy truck that requires exceptional traction and non-skid tires, why don't you put Goodyear Individual Block Tires on the rear (single demountables on front)? Then you'll have no extra tire equipment to carry, except a few blocks. And when you want to replace a block, you won't have to remove a dozen or so. Each block goes on and off *individually—quick!*

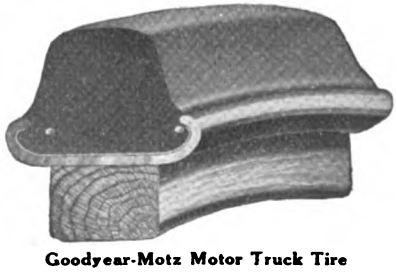


Goodyear Demountable Solid Tire.

If you want easy tires to put on and take off your heavy truck, see what we give you in the Goodyear Demountable Tire. There's no tire in the world more quickly and easily replaced—and we guarantee this tire specifically for 10,000 miles.

If you've a light, high-speed commercial car, how better can you protect it than by equipping it with Goodyear-Motz Truck Tires?

Yet these are but three of the 1912 types of Goodyear Truck Tires. They are *all* shown in large photographic illustrations and detailed description, in our handsome new 12-page (12x18) Motor Truck Tire Circular. May we send you a copy and thus help you to solve your truck tire problems?



Goodyear-Motz Motor Truck Tire

Surely you won't invest in truck tires until you have investigated the best tires that the Goodyear engineers can build, after thirteen years' wide experience.

Write today and you will hear from us by return mail. Please give model and make of your car.

The Goodyear Tire & Rubber Co., Akron, Ohio

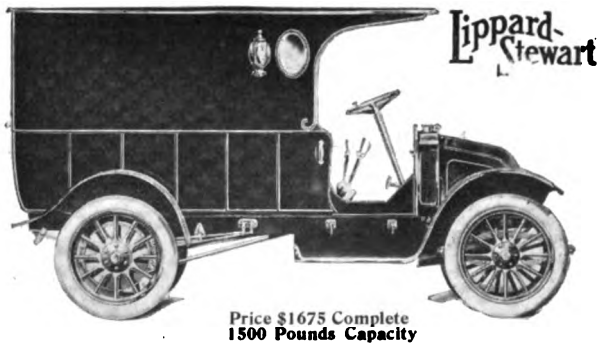
Branches and Agencies in 103 Principal Cities (623)

More Service Stations than any other Tire

We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits

Main Canadian Office, Toronto, Ont. Canadian Factory, Bowmanville, Ont.

A Tire for Every Service



Price $1675 Complete
1500 Pounds Capacity

More Strong Selling Points on Lippard-Stewart Delivery Cars

In our last advertisment we discussed (1) the economies of the small motor with large gear reduction; (2) the elimination of unnecessary parts; (3) the accessibility of all parts on the Lippard-Stewart. Following are some of the additional advantages of this remarkable delivery car.

Left-Hand Steering—With the gear-shifting and brake levers in the center and the steering post at the left of the car, the driver can enter or leave the Lippard-Stewart from either side.

This saves time and is a great convenience in making deliveries. It permits the driver to alight on the side-walk instead of in the mud.

It also gives him a better view of passing vehicles and lessens the chance of accidents.

Improved Spring Suspension—Lippard-Stewart spring suspension lessens road shocks and reduces vibration—the most destructive factor in the operation of a motor vehicle. The more completely the road shocks can be absorbed by the springs, the longer the mechanism will last and the less will be the cost for repairs and for tire renewals.

Full elliptic front springs on the Lippard-Stewart have twice the shock-absorbing qualities of ordinary semi-elliptic springs. At the rear an ingenious combination of a long semi-elliptic with a coil spring makes the car ride almost as easily empty as when loaded.

Mechanical Excellence—All of the mechanical features of the Lippard-Stewart are of well-known. recognized excellence. The same motor has been used for more than two years in the hardest kind of taxicab service. The transmission is of standard type, strong enough for a 40 h. p. motor instead of the 22 h. p. Lippard-Stewart engine.

The clutch is of the multiple disc type used on the highest grade cars. The axles are of the Timken make, specially built for the Lippard-Stewart. Wheels are of the heavy artillery type, with thick, sturdy spokes.

Ignition is furnished by a Bosch magneto, the recognized standard of the automobile world. And so all through—there is not a single mechanical feature whose worth has not been thoroughly proved.

Handsome Lines — Beautiful Finish — Wherever seen, Lippard-Stewart cars attract attention by reason of their handsome design. The graceful French type of hood; strong, substantial, sweeping fenders; big wheels and beautiful bodies—appeal to everyone. The Lippard-Stewart car is a constant advertisement for the progressive merchant who owns one.

These are only a few of the many strong selling points of the Lippard-Stewart—features which appeal to the customer and which make the car a good selling proposition for the dealer.

Write for our catalog and further information about the money-making possibilities of this car. Excellent territories are still open, and we are always glad to get in touch with live dealers. We have the facilities to make prompt deliveries.

LIPPARD-STEWART MOTOR CAR COMPANY

BUFFALO, N. Y.

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Skyrockets vs. real Storage Batteries

A skyrocket is a pretty thing, but alas, its life is brief and expensive. It hits a tremendous pace for a few seconds and then — puff! all is over.

There are expensive batteries that, for a short time, hit the pace that kills. During that brief period they actually appear to have the **Gould Battery** bested, but—puff—they go to pieces in a hurry while a **Gould Battery** plugs along at an efficient gait, sticks to its work and easily wins in every actual service competition.

At present there is talk against the reliable lead plate storage battery. Crafty attempts are being made to deceive the public. An enormous first cost is being placed on the new-fangled batteries, which cost anywhere from two to four times what we charge for **Gould's** but still give unsatisfactory results. You are later obliged to get a duplicate set of similiar unsatisfactory batteries "for almost nothing"—although you have already more than paid for the second set. It's the old holeproof sock game.

We make no extravagant promises for **Gould Batteries** are no experiment. We do know and can prove that **Gould Batteries** have service records unparalleled by any other battery; that they are replacing second sets of higher priced batteries nearly every day; that they are doing this solely on the strength of prestige gained through years of honest and highly profitable service; that they give larger returns per dollar of investment; maintain an average capacity by far higher than any other; and in every way yield ultimately satisfactory returns.

By all means, investigate before investing. Get figures, and be sure the figures cover every phase — first cost, capacity, volume, weight, efficiency for various discharges, rate of discharge while standing idle, damage done by overcharging operation in cold or warm climate, and attention required for keeping in shape.

If you weigh and consider everything carefully you will find the **Gould Battery** standing on its merits and a highly profitable investment. Write for literature. 26

Gould Storage Battery Co.

General Offices: 341 Fifth Ave., New York City
Works: Depew, New York

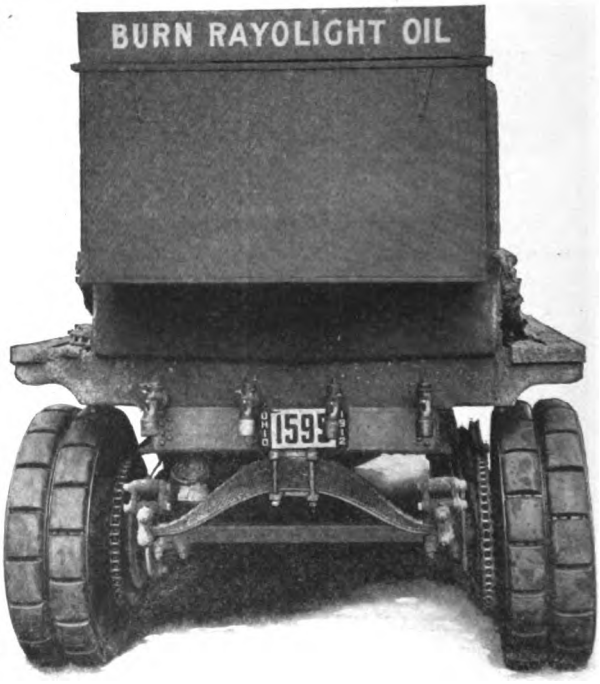
Boston, 89 State Street — San Francisco, 904 Rialto Bldg.
Chicago, The Rookery — Cleveland, Amer. Trust Bldg.

AGENTS IN ALL LARGE CITIES.

Victor Sectional Truck Tires

operated during the past winter without chains. Have you had chain troubles with your Tires? Why not investigate the Victor? Simple to renew. Simple to repair. Can be used single or dual. Perfect traction. More resilient than endless.

Write for quotation and guarantee.



Oil Tank Motor Truck equipped with Victor Sectional Truck Tires. Weight with load, 16,000 lbs.

The Victor Rubber Co.

Springfield, Ohio

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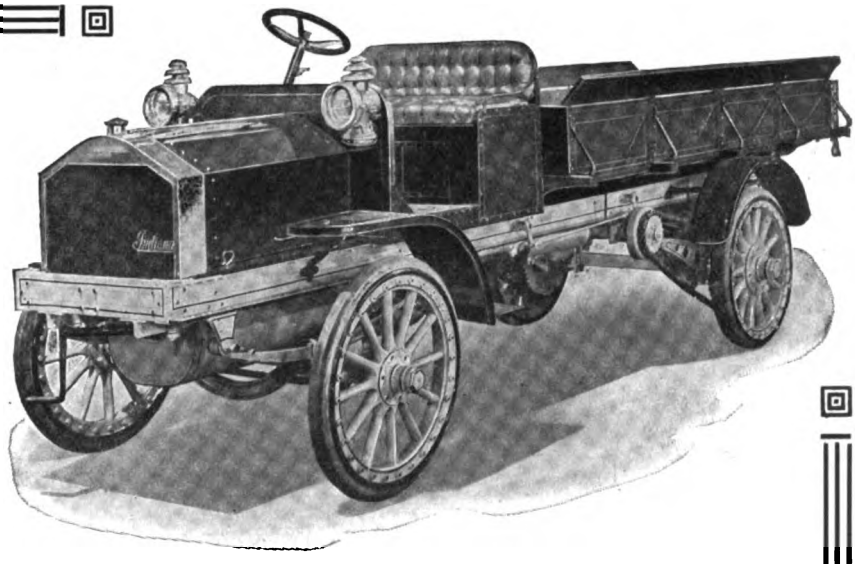
The INDIANA

1 to 1 1-2 Ton Truck



Made in Marion, Indiana, by a Long-Established Company of Ample Resources.

Built for Hard-Duty Service

MORE POWER—MORE STRENGTH IN EVERY STRAIN-BEARING PART—GREATER SIMPLICITY OF CONSTRUCTION—AND GREATER GENERAL SERVICEABILITY THAN YOU'LL FIND IN OTHER TRUCKS OF SIMILAR HAULING CAPACITY AND PRICE.

Compare the Extraordinary Value of the INDIANA With Any Other One and One-half-ton Truck Built —Compare the Specifications.

SPECIFICATIONS.

Engine—30 H. P. Rutenber, ignition Bosch DU 4. No 2 fixed magneto

Clutch—Multiple disc, 61 steel plates running in oil bath.

Transmission—Sliding gear, selective type, 3 speeds forward, 1 reverse.

Steering Gear — Irreversible type with 16-inch hand wheel

Jack Shaft — Semi-floating type, shaft 1⅞ inches nickel steel.

Frame—5-inch channel steel.

Axles—Front, I-beam, 1¾x2¾ inches, 1⅞-inch spindle; rear, rectangular 2x2½ inches, 2⅛ inch spindle.

Tires — Solid rubber; front 34x3, rear 34x4.

Weight of chassis 2,850 pounds.

WE BELIEVE you automobile dealers and builders will appreciate the money-making possibilities of the **INDIANA** Truck.

It is in a class by itself as to value and its extraordinary price practically eliminates competition.

With the agency for the **INDIANA** in your territory you can walk away with all the ton to ton-and-a-half business in sight.

There is nothing in the market that can compare with it either in quality or price.

Think of it! A 30 H. P., 4 x 4, truck-type Rutenber motor that has been tried and tested under every known road and load condition for years, and found to more than "stand the gaff"; a 60 H. P. disc clutch containing sixty-one steel plates running in a bath of oil; axles forged in one piece, made under a chemical analysis at Pittsburgh, the home of good things made of steel; great roomy bodies built for any and every purpose, and all done in a factory at Marion, Indiana—the home of the Rutenber motor—by men who have been in the manufacturing business for generations and who have learned that the safest, most economical policy is to "build well or not at all."

If you want to earn an extra profit this year, if you want to make some "quick-money," set down and write us for more information about this remarkable truck—the 1 to 1½ ton truck that you can rely on to meet all the claims made for it.

We'll tell you all about the many mechanical features that make it a reliable, serviceable truck as well as an easy, quick seller. And we'll make you an agency proposition for your territory—if it hasn't already been snapped up—that cannot fail to interest you. Our output is limited (as it must be if we build as well as we should) and inquiries are coming in every day. So write today for territory.

HARWOOD-BARLEY MFG. CO.

200 HENDERSON AVE., MARION, INDIANA, U. S. A.

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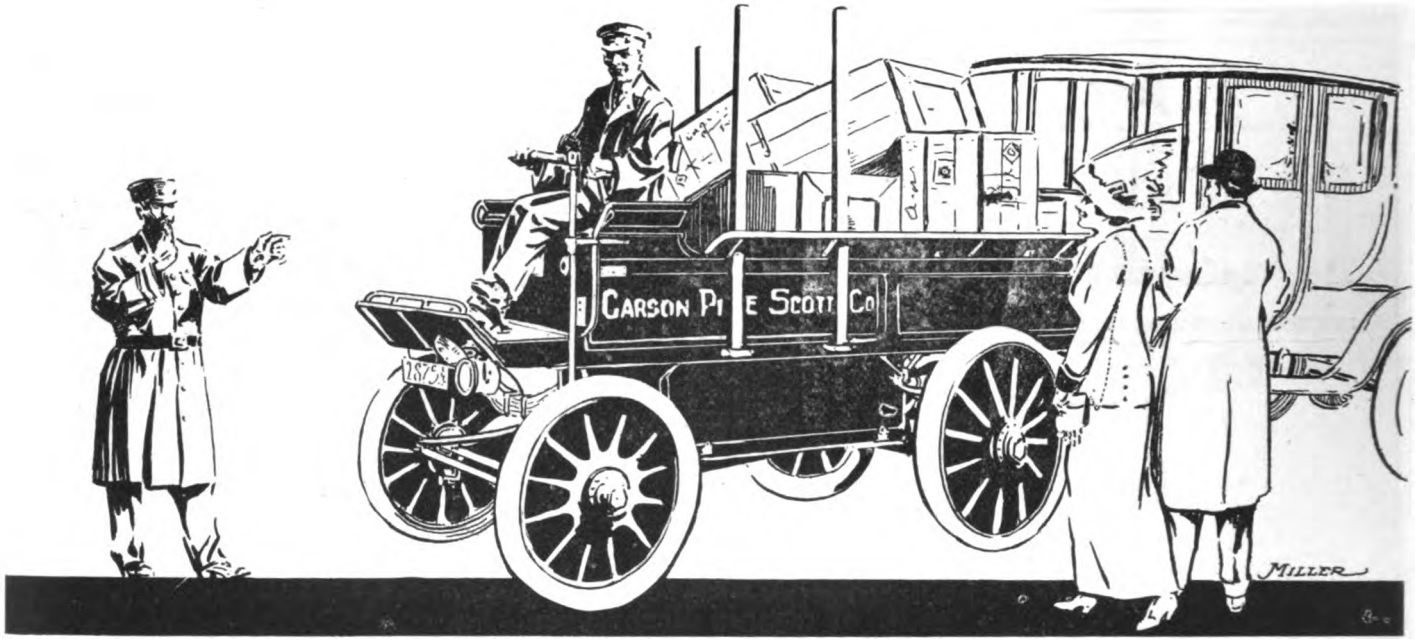

The Acme of Trucking Simplicity

With the electric truck it is not necessary to employ skilled operators. Any man who can drive a horse can drive an electric truck. He can not only drive it, but he can obtain good results. He is surer that he will make his deliveries and get back than is the expert in charge of a gasoline machine.

No Gears to Change
No Levers to Regulate
No Complicated Machinery

All Speed Regulation is done with one lever

Electric trucks have attained such perfection, and at the same time the price of central station power has been so reduced that electric trucks have become an actual need. The success of your delivery service is directly dependent upon the simplicity of operation and the reliability of your trucks. There can be no greater economy than that which results from the use of Central Station Power.

The Special Automobile Department of the Commonwealth Edison Company is always at your service. Experts are ready to advise you as to cost, type of truck needed, and all other matters connected with electric trucking.

Let our experts solve your problems.

Commonwealth Edison Company

Telephone Randolph 1280 **120 WEST ADAMS STREET, CHICAGO**

(46)

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15 of a fleet of 22 Detroit Electric Commercial Vehicles used by Carson, Pirie, Scott & Company of Chicago, Ill.

Wherever Electricity has solved any problem it has done so better than any other form of power

Detroit Electric Commercial vehicles "get away" instantly in congested traffic. All speeds are controlled with one lever. Any ordinary driver can learn to operate a Detroit Electric. No expert care is neccessary. There is no complex mechanism to be put out of order by abuse or carelessness. When the car stops the power stops—and the expense for power.

Detroit Electric commercial vehicles are noiseless, odorless, trim in appearance and are particularly appreciated by customers in all residential districts. They are admitted at all wharves and freight terminals. Fire hazard is reduced to a minimum. All body space is available except the driver's seat. They occupy only their own space in a garage.

THE Detroit ELECTRIC

Commercial Vehicles

are built exclusively for the Edison nickel and steel battery. This battery of itself is about 300 pounds lighter in a Detroit Electric commercial vehicle than a lead battery equipment. This admits of an all metal chassis and lighter construction throughout the car. Lighter weight means more mileage, less wear on bearings and tires and less cost for power to move the car and its load.

The Edison battery is guaranteed to develop its full rated capacity at the end of four years. Our experience has proven that the battery increases in efficiency with use, even greater than the guaranteed capacity. This battery is practically indestructible. There are no renewals, no acids. It can be short-circuited, charged backward, overcharged, discharged to zero and left standing indefinitely.

The saving which would be effected by the use of the cheapest and most readily adapted form of power in existence, is made possible for you through the use of Detroit Electric commercial vehicles.

48-page illustrated catalog with full information will be sent on request. Specific information regarding your individual requirements will be gladly furnished.

ANDERSON ELECTRIC CAR COMPANY

455 Clay Avenue, Detroit, U. S. A.

Branches:

New York:—Broadway at 80th Street Chicago:—2416 Michigan Ave.
(Also Branch at Evanston, Ill.)

Brooklyn
Buffalo
Cleveland
Kansas City
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Selling representatives in most leading cities

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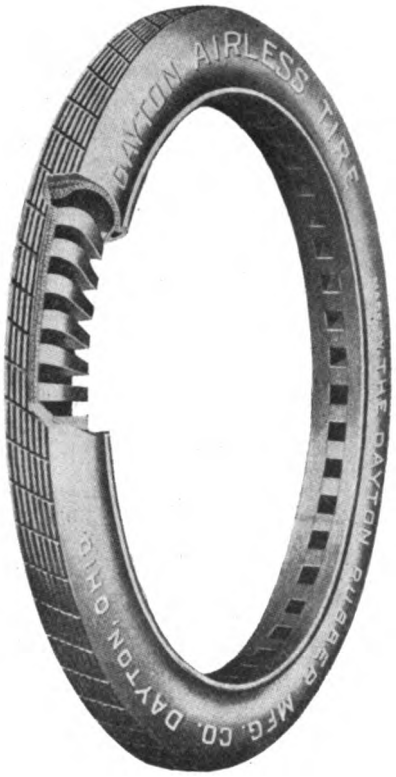
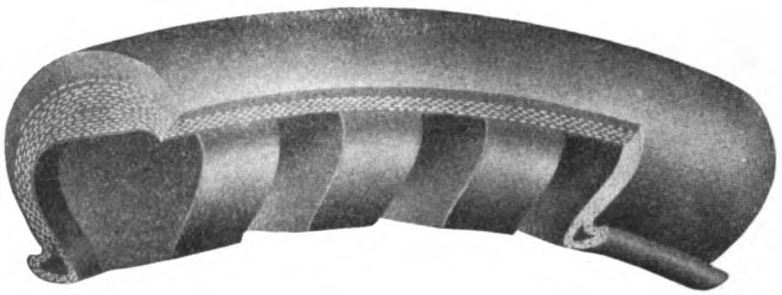


Perfect Resiliency Without Air

Dayton Airless Tires

Ride Easier Than Pneumatics
Wear Longer Than Solid Tires



Have proved records of 15,000 Miles without a single repair

ROAD DELAYS IMPOSSIBLE

The best tire for municipal machines which must respond speedily to alarms. Owners of motor wagons equipped with pneumatic and solid tires will obtain **Greater Tire Mileage and Economy** by using

DAYTON AIRLESS TIRES

The great speed at which solid-tire equipped, light capacity motor wagons are run, causes destructive vibration to motor, transmission and other moving parts, thereby **increasing** repair bills, **shortening** the life of the vehicle, **which means high depreciation,** and makes a motor wagon less attractive as an investment.

The Test of Fire-Engine Wear and Strain

has triumphantly proved The Dayton Airless Tire supreme in every feature—most efficient for every motoring requirement. The American-La France Fire Engine Co., manufacturers of 75% of all fire engines used in the United States, have adopted Dayton Airless Tires for all their Auto Fire Fighting Apparatus. This was the result of most exhaustive and critical tests by their own and other expert engineers and practical fire-fighters. To get to destination without ever the possibility of a moment's delay; to stand the wear and tear of going at terrific speed; for highest degree of protection to sensitive and complicated machinery; for lowest upkeep cost; for best service in every particular—the Dayton Airless Tires scored in these all-embracing tests far above every other tire known.

Insist on Dayton Airless Tires for Your Car

Do your own thinking and put the proof up to us. You will no longer waste your money on makeshifts, tire extras—and bearing all the other burdens thrown on you by tire troubles. Investigate these absolutely trouble-proof Airless tires—and you will find that they give you every desirable tire-quality.

Dayton Airless Tires are made in Special for Electrics—also for any kind of Motor Truck service. Fit all Standard Clincher and Universal Q. D. rims.

COPY

AMERICAN LA FRANCE FIRE ENGINE CO.
Elmira, N. Y.
Feb. 12,1912.

Dayton Rubber Mfg. Co.,
Dayton, Ohio.

Gentlemen:

It may be of interest for you to know that after making a series of practical tests of your Airless Tires, we have adopted same as the standard equipment for our power driven apparatus.

We feel much gratified over the tests we have made as we believe we have now solved the tire problem for fire apparatus.

The special tire, which you are building for us on our specification in two sizes; one for our 4-cylinder and the other for our heavier six-cylinder apparatus, allow running our cars at maximum speeds of 50 or more miles per hour without the serious hold-up of puncture or the positively dangerous result of blow-out, especially if it occurs in the front wheels.

We find these tires are as resilient as pneumatic and in so far as these cars have been in actual operation in the hands of our customers, from all reports, we believe their wearing qualities will be superior to either pneumatics or solid.

We think the tire is an ideal one for fire department apparatus.

Yours very truly,

J. R. Clarke,
Pres. & Gen'l. Mgr.

JRM/s

(C O P Y.)

CITY OF SAVANNAH.

Office Fire Department.
Corner Oglethorpe Ave. & Abercorn St.

Savannah, Ga., April 4th. 1912

Mr. J. A. MacMillan,
Gen. Mgr., The Dayton Rubber Mfg. Co.,
Dayton, Ohio.

Dear Sir:

Your favor of April 3rd to hand, in reply, I beg to say that in my opinion, the Dayton Airless Tire is the best Tire on the market for Fire Apparatus. It has given the very best satisfaction in this department.

Yours truly,

Thos. Ballantyne,
Chief Engineer.

THE DAYTON RUBBER MFG. CO.

103 KISER STREET - - - DAYTON, OHIO

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Jarvis-Huntington Motor Trucks

Not alone up-to-date, but actually ahead of date

2 Ton Capacity $2750.00 **3 Ton Capacity $3500.00** **5 Ton Capacity $4400.00**

The Strongest and Most Compact Truck on the Market.

Jarvis-Huntington Exclusive Features:

I. **Motor:**—After three years of testing out, we offer the most economical and sturdy power plant in the market. Bore 4" x Stroke 6". 4 Cylinders cast separately. 4 Cycle. Valves in the head with overhead cams. Fitted with self starter.

II. **Clutch:**—Hele-Shaw, the best there is.

III. Jarvis-Huntington selective transmission. Chrome-vanadium gears, specially toughened.

IV. A special brake system that positively will stop the truck within its own length even at maximum speed.

V. Inspection of raw material and of finished parts carried to extreme.

VI. A guarantee of 10,000 miles service—no frills about it.

VII. **Complete equipment:**—Electric light, electric horn, tools, and a liberal supply of spare parts.

VIII. Above all—a square deal to agents and users.

We want the co-operation of some live dealers. We have an extremely attractive agency proposition. NOW is the time to write to

Jarvis-Huntington Automobile Co., Huntington, W.Va.

Subscription Agents Wanted

In cities and territory where we have no agents we desire to obtain the services of active representatives for our subscription department. Apply to

THE POWER WAGON
CHICAGO

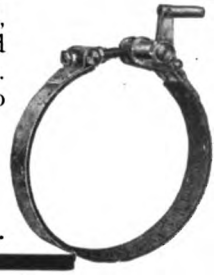
LIBERAL TERMS.

DUPLEX EXTERNAL BRAKES

ACT INSTANTLY
Forward or Backward

How are your brakes?

—A new set would make your truck or delivery wagon more efficient and safe. Get a set of Duplex brakes. Inexpensive, easily installed, do away with all troubles. Be safe and sure about your brakes above all things. Write to us today. We'll be pleased to quote prices and give full particulars.



We also make the Raymond Brake, Raybestos Brake Lining and Gyrex Mixer.

THE ROYAL EQUIPMENT COMPANY
482 Housatonic Ave. - Bridgeport, Conn.

Hyatt Roller Bearings

Will be used in almost all American built cars this year because of their efficiency.

Are they being used in yours?

Hyatt Roller Bearing Co.

Detroit, Mich.

VICTOR

THE PARTICULAR TRUCK FOR THE PARTICULAR MAN

Investigate the VICTOR before you buy. You may find a truck that is just as good—but you cannot get any better. Write for catalog.

Victor Motor Truck Co.
1008 Ontario St.
Buffalo, N. Y.

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Standard Parts

For Motor Truck Builders

¶ With the exception of springs and wookwork, we manufacture a complete line of standard parts for motor trucks of 1, 2, 3, 4 and 5 ton rating.

¶ We will gladly furnish prints of chassis of models which can be built up from parts we make.

¶ Firms engaged in the production of motor wagons should not overlook the importance of investment entailed by providing both factory space and facilities for assembling. Money must be freely spent for this purpose for a number of years to come, while throughout the period the models produced will be gradually assuming final form. Whatever this minimum investment may be, it must be apparent at the outset that the only way to keep it low, and at the same time maintain factory output, is to draw upon the engineering skill and resources of the parts maker, who in order to exist must provide unusual facilities for quantity production and anticipate every change in a very sensitive market.

¶ We have the reputation for doing big things in a big way. Our large plant and our talented engineering force are wholly at your service in order to simplify your problems of production.

¶ If you need advice from a firm which has acquired experience in the making of motor truck parts—and knows the arduous duty to which they are subjected in commercial practice—consult us.

Blue Prints on Application.

Driggs-Seabury Ordnance Corporation

SHARON, PENNA.

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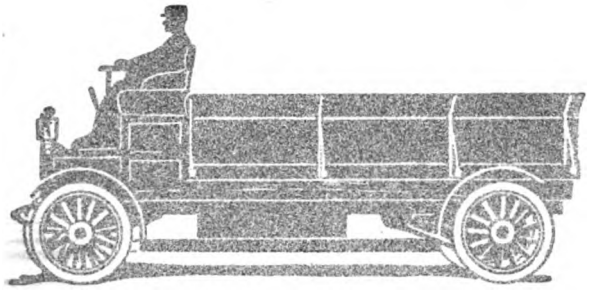


Going To Build Electric Trucks?

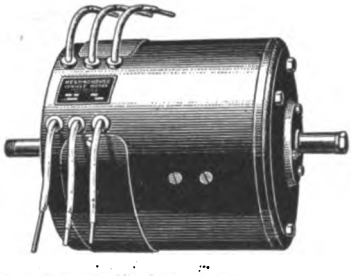
MANUFACTURERS of gasoline trucks who are considering building electric trucks should call upon the services of the Westinghouse electric vehicle engineers.

The recognized success of Westinghouse vehicle equipment is due to the use of apparatus of proven reliability, and its proper application.

The equipping of a truck with the proper motor, controller, and battery is a problem in transportation engineering. The long successful experience of the Westinghouse Company in this field enables it to solve such problems in the most satisfactory way for its customers.

Ask the Westinghouse Engineers to consider your problem. Write Dept. 56 today.

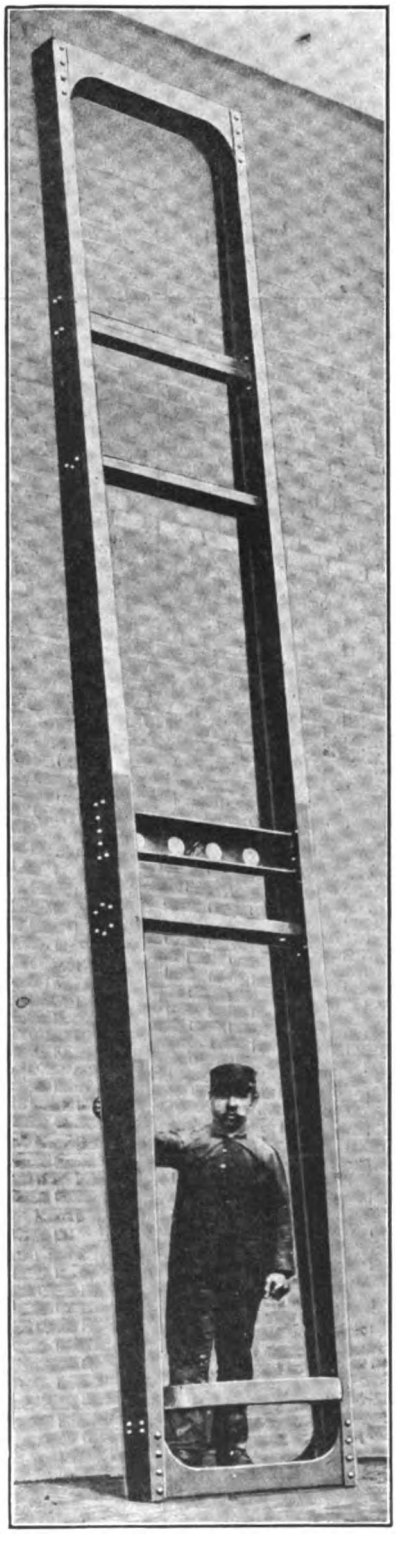
Westinghouse Electric & Mfg. Company
East Pittsburgh, Pa.
Sales offices in 45 American cities



WESTINGHOUSE
the MOTOR you never have to think about

HYDRAULIC
PRESSED STEEL COMPANY
CLEVELAND, OHIO

R. B. McMULLEN, General Sales Agent
CHICAGO, ILL.



TRUCK FRAMES
½ TON TO 10 TON

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Think This Over

Supreme in the Oil Industry
Forty Years of Experience in the Making of Oils
Modern Equipment for Improvement
Recognized Standards to Maintain

RESULT:

Carbon Proof

Polarine

Frost Proof

A FROST AND CARBON PROOF OIL

The Standard Oil for Motors

We begin to perfect it at the point where most oils are deemed finished. Our supremacy lies in our experience, facilities and resources.

-Everybody Knows That.

Polarine adds life and power to all motors by its friction-reducing properties.

For Sale EVERYWHERE

By All Reputable Dealers

The Saving in Barrels

Those who usually buy oil in small amounts can save a neat sum buying by the barrel or half-barrel. It's economy for everyone who owns a gas car to buy this way.

Polarine Lubricants

Prepared in consistencies to meet individual preference—and mechanical conditions of transmissions, differentials, universal joints, ball and roller bearings, timing gears, etc.

"A" grade . . Semi-Fluid Oil
"B" grade . Semi-Fluid Grease
"BB" grade . Semi-Solid Grease

Also include Cup Grease and Fibre Grease of high melting point.

All are called POLARINE and are the recognized standard greases for Motor Car and Motor Boat lubrication.

Each grade has superior merit in durability and cushioning properties.

Standard Oil Company

(An Indiana Corporation)

Write for free booket "Motoring in Zero or Tropical Weather."

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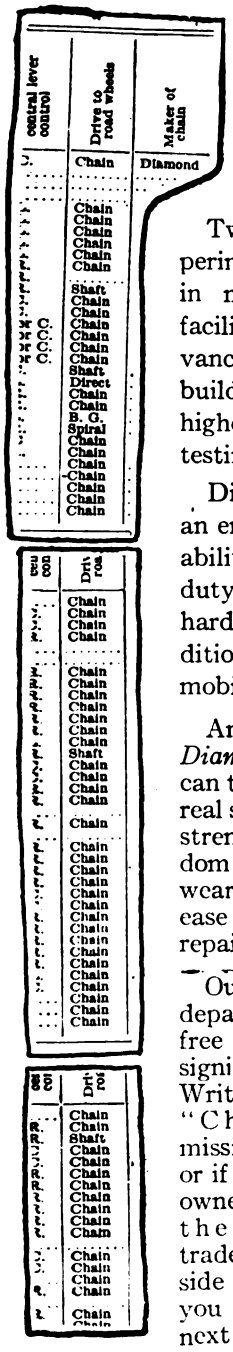
Isn't this good evidence that chain drive is best?

This list, clipped from a leading commercial vehicle paper, tabulates the drives on America's leading commercial cars as exhibited at the Madison Square Garden Show last January. It speaks for itself as to the supremacy of chain drive. It means that more chains are now used than ever and that chain drive is still growing in popularity.


Control lever control
Drive to road wheels
Maker of chain
Chain Diamond
Chain
Chain
Chain
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Shaft
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Chain
Chain
Shaft
Direct
Chain
Chain
B. G. Spiral
Chain
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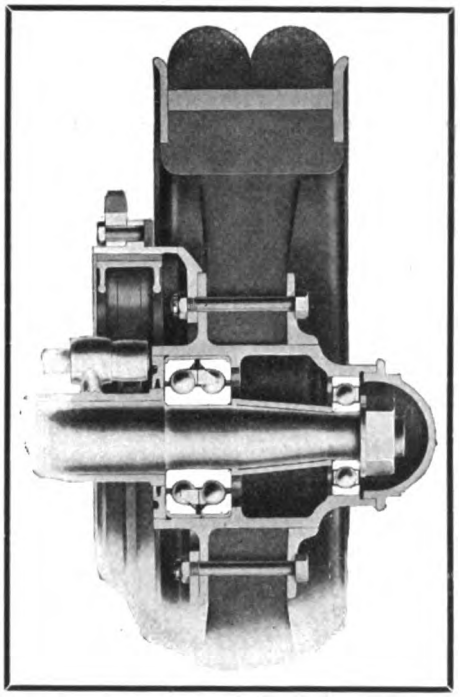
Chain

AMERICAN MADE FOR AMERICAN TRADE

NEW DEPARTURE
GUARANTEED
BALL BEARINGS

GUARANTEED FOR COMMERCIAL TRUCK WORK



In the application shown on this page, the double row is mounted within the spoke or load center of the wheels on a truck axle in such a way as to carry radial and all direction thrust and to take the major portion of the load. The outer single row bearing is floated to carry radial loads only and to steady the wheel.

The bearing equipment of the modern motor vehicle of any type or load rating is vital to the efficiency of the car.

New Departure ball bearings are preferred to any other type because of the following qualities:

The double row type has two rows of balls, thereby increasing the load carrying capacity and providing ample safety margins for the inevitable overloading of the trucks.

The double row bearing is equally efficient for thrust or radial loads. This bearing carries maximum stresses from any direction simultaneously and without friction or cramping of the balls.

The double row embodies a safe ball bearing unit in which the adjustment and alignment are absolutely maintained under all conditions.

The double row ball bearing economizes space, materials, time and labor of mounting and cost.

This bearing is, therefore, superior for heavy duty required in motor trucks because of its excessive strength, double service, double efficiency and guaranteed durability.

We maintain an engineering service department in which highly specialized consideration of your bearing problems is at your command.

Write us today.

The New Departure Mfg. Co., Bristol Conn., Western Branch 1016-17 FORD BUILDING, DETROIT.

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Just See What Motz Cushion Tires Will Save You, Mr. Commercial Car Owner

Possibly you have the impression that the easy-riding qualities and long mileage of Motz Cushion Tires are what make them the choice of commercial car owners.

You may not realize that many a commercial car is equipped with Motz Cushion Tires largely because these tires are **power-economizers**—because they carry a car farther on a given fuel charge than any other tire—pneumatic or solid.

That's why twenty-two out of a possible twenty-five makers of electric cars have adopted these tires—and why eight makers of light commercial cars in the past six months have likewise adopted them.

It's **one** of the reasons why **your** car ought to be Motz equipped at this moment.

Motz Cushion Tires have double treads, which are notched, giving the Non-Skid feature; also distributing the weight to the undercut sides. The undercut sides are supported by slantwise elastic bridges, which give and yield like the air in pneumatic tires.

Neither punctures or blowouts affect them.

They are **guaranteed** for 10,000 miles—two years.

Easy to put on—for they fit any standard clincher, universal quick detachable or demountable rim.

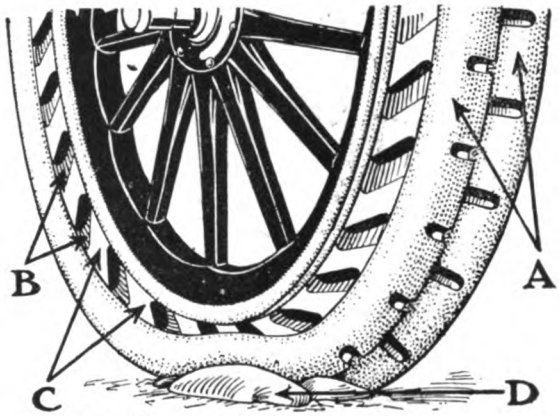
Why don't you **investigate** Motz Cushion Tires? Look into the matter and see if the thousands of commercial car owners who discarded pneumatics and solid tires for Motz Cushion Tires have made a mistake—Let us send you their experience, as **told in their own words.**

If Motz Cushion Tires **are** great economizers, you surely want them. How are you ever going to know absolutely, until you look into the proposition?

Write for our booklet 92. We can give you more specific information if you will state the make and model of your car.

The Motz Tire & Rubber Company, Factories and Executive Offices: AKRON, OHIO

BRANCHES—1737 Broadway, New York; 2023 Michigan Avenue, Chicago; 999 Woodward Avenue, Detroit; 409 East 15th Street, Kansas City; 2352 Euclid Avenue, Cleveland. Standard Tire & Rubber Co., 104-6 Portland Street, Boston, Distributors for New England States.

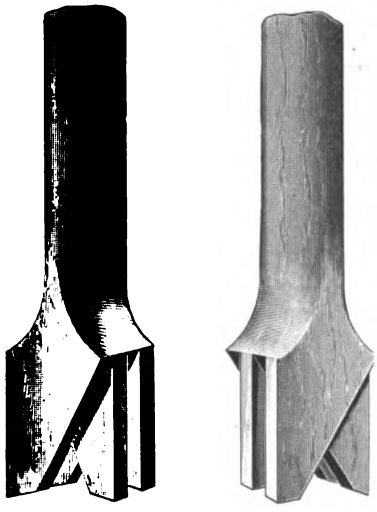


A—Shows double, notched treads.
B—Shows undercut sides.
C—Shows slantwise bridges.
D—Shows absorbing means when passing over an obstruction.

WHY Is the Schwarz Wheel

Used on all the leading Motor Trucks?

Because it is the **Strongest, Safest** and most **Economical,** and will stand up where every other fails.



Schwarz Patent Spokes

The special features of construction--the interlocking spokes, the tight immovable center assemblage, insure the wheel under the most severe strain. Spokes cannot work loose, and it will always run true.

You want the **best** for it is the **cheapest** in the end.

Write for Information. Consult Us on Design and Proportion.

The Schwarz Wheel Co.
FRANKFORD - - PHILADELPHIA

AUTOBESTINE

Partial List of **AUTOBESTINE** users:

Speedwell **Thomas**
Kelly **Autocar**
Alden-Sampson
Cole **&c., &c.**

Who is more competent to judge the merit of brake lining than the manufacturer of rear axles?

The Timken-Detroit Axle Co., Standard Roller Bearing Co., and other axle manufacturers use **Autobestine Brake Lining.**

If you manufacture a truck, car or rear axle, we will be pleased to send you a sufficient quantity of **Autobestine** for test.

Woven Steel Hose & Rubber Co.
TRENTON, N. J.
NATIONAL SALES CORP., Factory Sales Manager.
250 W. 54th St., New York—944 Woodward Ave., Detroit

Magneto Bargains

$30.00 for a **$105.00 6** cylinder
$20.00 for a **$93.00 4** cylinder
$18.00 for a **$65.00 2** cylinder
$16.00 for a **$60.00 1** cylinder

Imported U. & H. High Tension Magnetos Less Than Import Cost

Circular and Price Lists Free

J. S. BRETZ COMPANY, 250 W. 54th St., New York

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What Makes the Commercial Car a Practical Possibility?

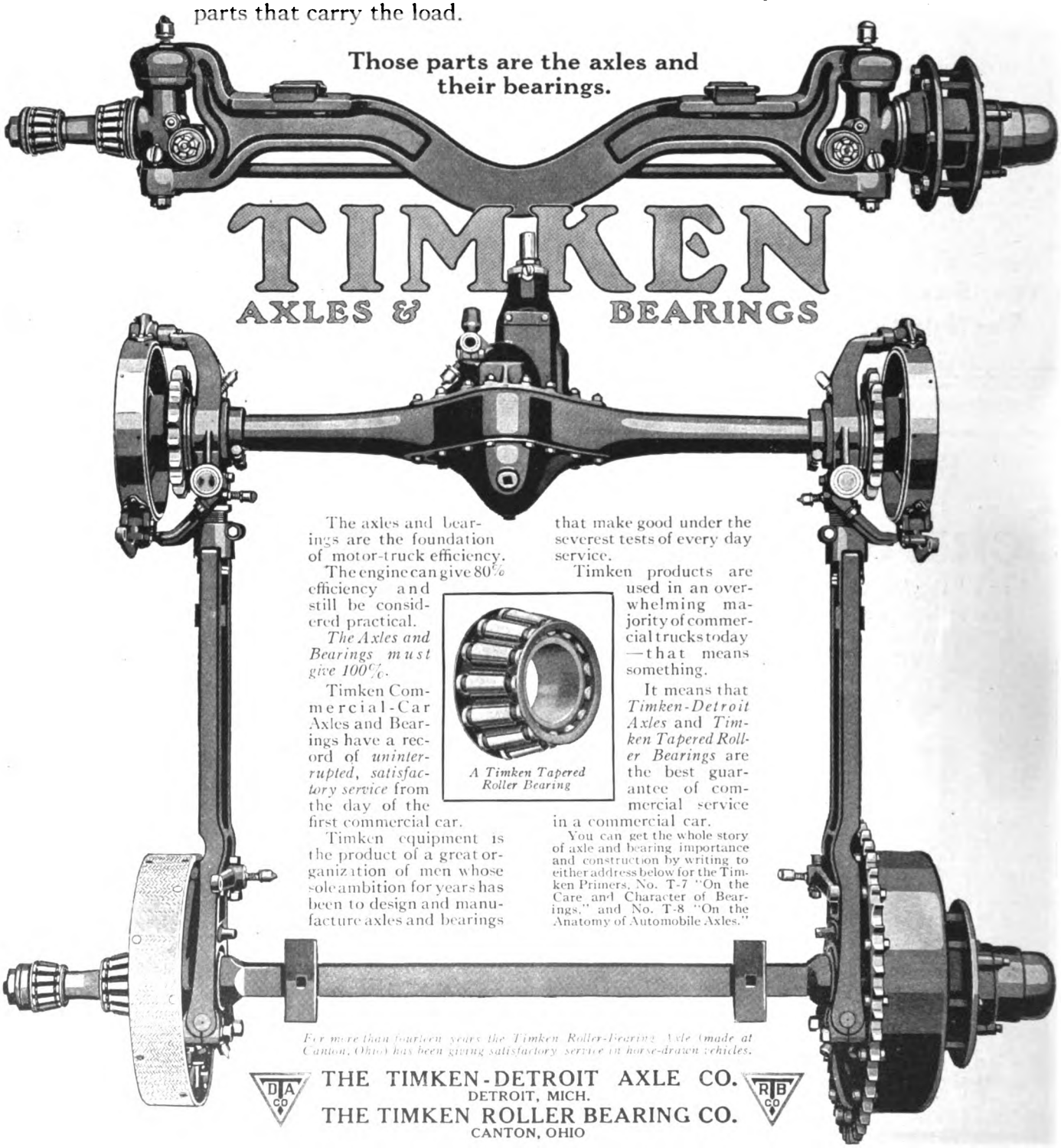
Strength and flexibility in the parts that carry the load.

To be commercial a motor-truck must carry its load in a commercial way.

It must give uninterrupted service—good service—over any road—ten hours a day—*every working day* in the year.

To do this it must have strength and flexibility in the parts that carry the load.

Those parts are the axles and their bearings.



The axles and bearings are the foundation of motor-truck efficiency.

The engine can give 80% efficiency and still be considered practical.

The Axles and Bearings must give 100%.

Timken Commercial-Car Axles and Bearings have a record of *uninterrupted, satisfactory service* from the day of the first commercial car.

Timken equipment is the product of a great organization of men whose sole ambition for years has been to design and manufacture axles and bearings that make good under the severest tests of every day service.

A Timken Tapered Roller Bearing

Timken products are used in an overwhelming majority of commercial trucks today—that means something.

It means that *Timken-Detroit Axles* and *Timken Tapered Roller Bearings* are the best guarantee of commercial service in a commercial car.

You can get the whole story of axle and bearing importance and construction by writing to either address below for the Timken Primers, No. T-7 "On the Care and Character of Bearings," and No. T-8 "On the Anatomy of Automobile Axles."

For more than fourteen years the Timken Roller-Bearing Axle (made at Canton, Ohio) has been giving satisfactory service in horse-drawn vehicles.

THE TIMKEN-DETROIT AXLE CO.
DETROIT, MICH.

THE TIMKEN ROLLER BEARING CO.
CANTON, OHIO

Please mention the "Power Wagon" when writing to advertisers.

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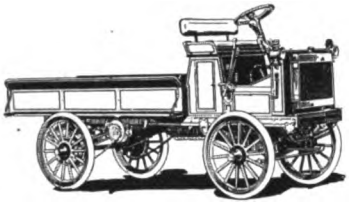
Sanford

Unfortunately there is but one competitor to Sanford Trucks



Chassis $1600

Stake or Express Body $1750

We're sorry about this in a way, for it narrows down our possible comparisons. But it makes it pretty easy for our representatives. There never has been a selling proposition in the field that can compare with the Sanford.

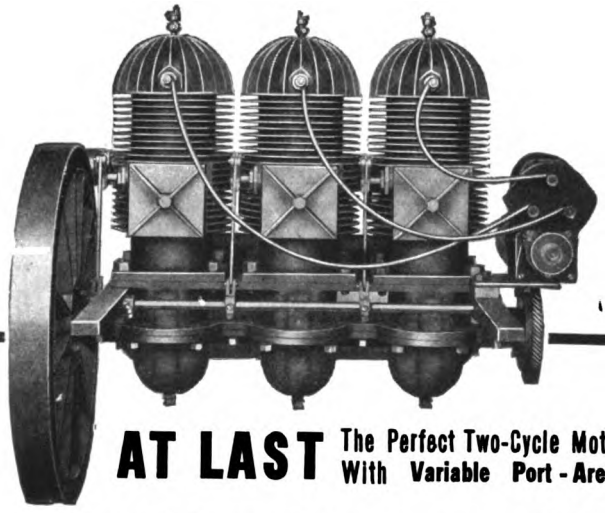
Nine long years' work on a one-ton truck gives you today this proposition, the success of which there is no gainsaying. There isn't a thing about this truck that's strange or freakish. Its success is not remarkable because of any thing unusual.

The Sanford truck is remarkable only because it is so certain to do more than you'll claim for it that your repeat orders will be more or less automatic.

The Sanford Motor Truck Co.

SYRACUSE, Park and Wolf Streets, NEW YORK

Makers Always and Exclusively of One-Ton Trucks



AT LAST The Perfect Two-Cycle Motor With Variable Port-Areas

The essential feature of Moore Motors is the increasing or decreasing of all the port-areas simultaneously (fully patented), giving flexibility of control and fuel economy.

Fixed ports, as in regular two-cycle design, mean lack of flexibility and high fuel consumption.

The result is a power plant combining two-cycle simplicity and low upkeep cost with four-cycle flexibility of control and fuel economy.

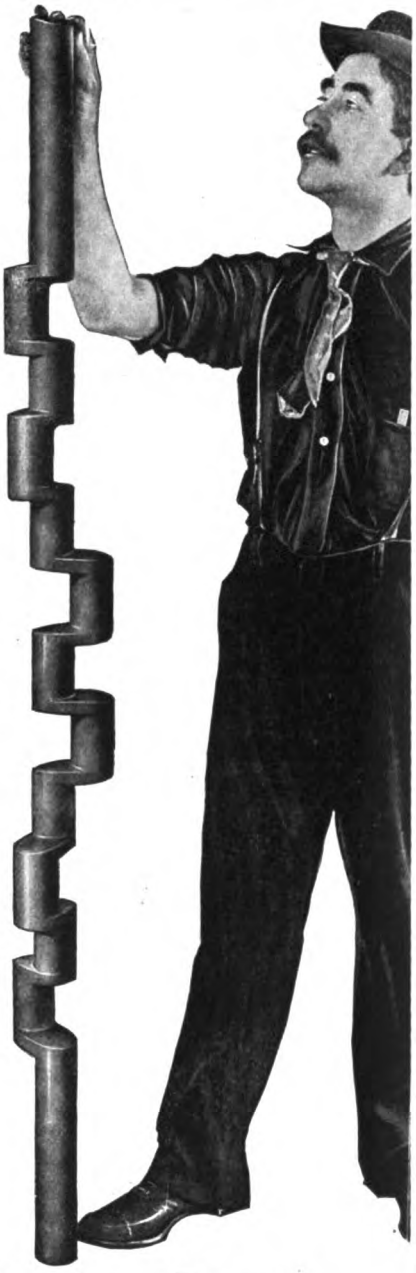
Moore Motors are backed by years of engineering experience. Send for descriptive circular.

PALMER-MOORE COMPANY

SYRACUSE, NEW YORK

"Stay Put"

That's the game in which we can give a hand. Materially, mechanically and chemically, we can help the product to stay sold and to sell more.



Possibly our stock lines may help you. The 1912 Catalogue (free) will be ready April 1st. Send your address and we will forward the book showing great increases in lines of

Superior Drop-forged,

Gas Engine Parts

—and—

Drop-forged Wrenches,

etc.

WRITE NOW! We're ready to send free blue prints, too, if necessary; or if your needs are special send your prints to us for estimate. Service considered we're cheapest Drop-forgers in the country.

J. H. WILLIAMS & CO.

Superior Drop-forgings

No. 69 Richards Street, Brooklyn, N. Y.

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EXPERIENCE — SHELDON — RIGHT DESIGN

FACILITIES — AXLES — RIGHT STEEL

"Made in the Largest Axle Factory in the World"

Axle Talk—No. 1

SHELDON axles take precedence in the commercial car field in quantity of production—at least seventy-five per cent of the trucks on the market being SHELDON-equipped.

If "quality" were not inherent, then the quantity output would necessarily be much smaller than it is.

A cheap axle is a mighty poor investment for the car manufacturer—and a mighty poor advertisement for the concern that makes it.

In a nut-shell, then, it stands that truck manufacturers base a very large percentage of car efficiency on axles and springs—they must use the best or take long chances.

You can safely judge SHELDON axles by good design, experience, the manufacturer and responsibility.

We will explain in later advertising why these factors have made the name SHELDON synonymous with quality production.

SHELDON AXLE COMPANY, Wilkes-Barre, Pa.

Chicago Office:
68 East 12th Street

Detroit Office:
1215 Woodward Ave.

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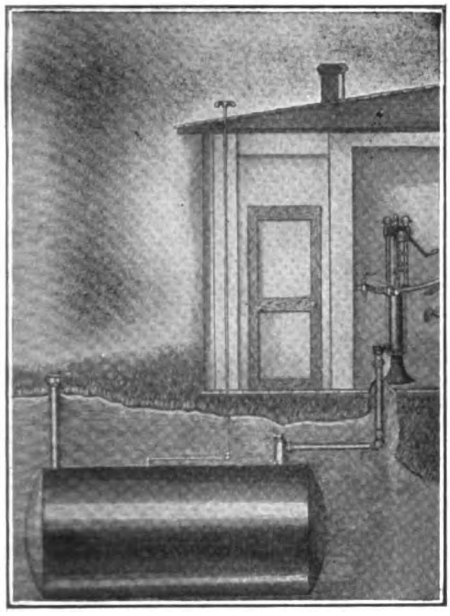

Motor Truck Owners

Are You Equipped with a

Gasolene Storage Outfit?

We manufacture Self-Measuring, Non-Measuring, Isolated, Inside Discharge and Multiple System **Gasolene Storage Outfits.**

Air Tight Tanks are constructed of 3-16 inch, or heavier, Open Hearth Steel with all seams and joints BRAZED. Every AIR TIGHT seam and joint is guaranteed to be as strong as the steel the tank is constructed of. A 100% tank.

Air Tight Outfits are listed by the National Board of Fire Underwriters

Note the effect of three men and a boy, total weight 640 lbs. on a 3-16" thick air tight shell. All air tight tanks constructed of 3-16" steel with all joints brazed. —A SEAMLESS TANK

The Highest Quality Gasolene Storage Outfits on the Market at the Most Reasonable Prices

Good territory open for experienced Tank Salesmen

Write today for catalog and prices

AIR TIGHT STEEL TANK CO., Pittsburgh, Pa.

CHICAGO
AIR TIGHT STEEL TANK CO.
No. 180 N. Dearborn St.

BALTIMORE
PEACE & PEACE
7 Congress St.

NEW YORK
EMPIRE TANK AND PUMP CO.
30 Church St.

BANDS
— and —
FLANGES
— for —
MOTOR TRUCKS

Perfect Workmanship
Excellent Material
Prompt Deliveries

The Standard Welding Company

CLEVELAND
NEW YORK CHICAGO DETROIT

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Joliet Electric Parcel Delivery Cars

NO SMOKE—NO NOISE—NO DANGER
ALWAYS ON THE JOB

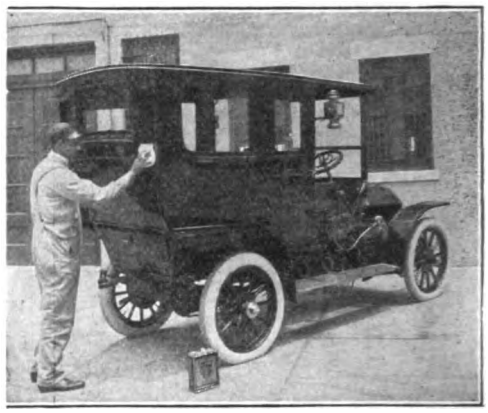
The perfect car for Banks, Jewelers, Furriers, Florists, Groceries, Laundries, Caterers, Dry Goods, Dyers and Cleaners, Confectioners, Bakers, Contractors, Tea and Coffee Stores, Clothiers, Haberdashers and Newspapers.

Good Agents can secure choice territory.

Write for complete particulars and literature.

JOLIET AUTO TRUCK CO., Joliet, Ill.

See the Cleanness and Luster Come!



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Use POLARINE—*the oil* for your motor car and motor boat

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(Made in Germany)

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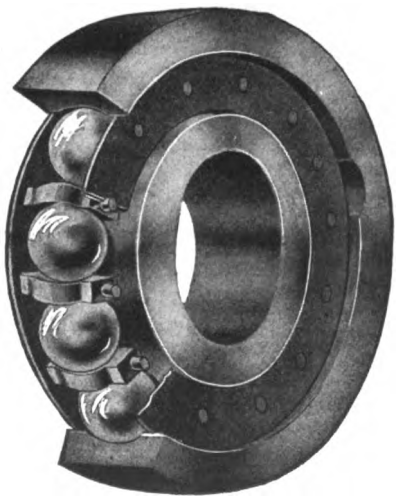
This is not a new bearing and therefore you will not be experimenting. The merits of SCHAFER ball bearings have been attained by actual service and not merely by "talk."



They have been adopted by prominent manufacturers here and abroad. This fact should convince you of the quality and efficiency of SCHAFER ball bearings.

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"The Tools That Are Guaranteed"

12-14 Inch Wrenches

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Hardened in the right places against wear.

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universal joint was the pioneer for shaft driven automobiles—either pleasure or commercial cars.

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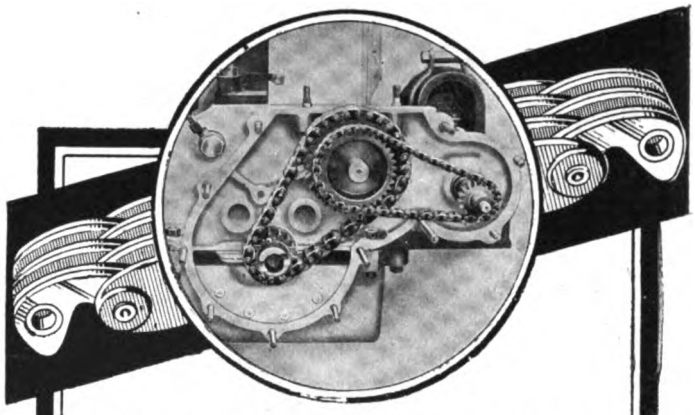

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in magneto, camshaft, and pump drives is reached by the application of the economical, reliable and silent

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The precision, automatic retention of pitch and long life are a few of the facts taken into consideration by many manufacturers of the most silent, reliable, and fashionable cars who fit these chains exclusively.

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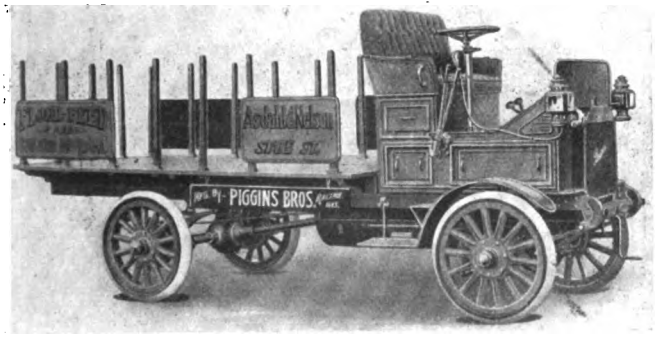
of Racine, Wisconsin, manufacture a complete line of motor trucks from 1 to 10 tons capacity.

Simplicity and accessibility are the dominant features of our long stroke truck motor.

Also as there is no chains to break and no sprockets to wear out as our trucks have a double rear axle and are all gear driven.



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Lubricates Without Waste

Because it possesses all of the well known lubricating qualities of Dixon's celebrated flake graphite. Flake graphite stays where it is placed, can't drip or grow sticky, lessens noise, stops wear and is cleanly because it has no tendency to collect dust, dirt, grit or other injurious matter to clog and wear out chains. Dixon's Chain Graphite is readily carried about and easily applied at any time by rubbing the bar against the sprocket side of the chain. Dixon's Chain Graphite is cleanly, convenient, economical and durable. The cylindrical shaped bar, 2x8 inches, just fits the hand. Each bar weighs about one pound and is neatly encased in a cardboard carton.

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Positively guaranteed not to leak for two years.
Used on all the **Leading Gasolene Trucks of America.**

Ten Years Test Has Proven the Best.

BEWARE OF IMITATIONS.

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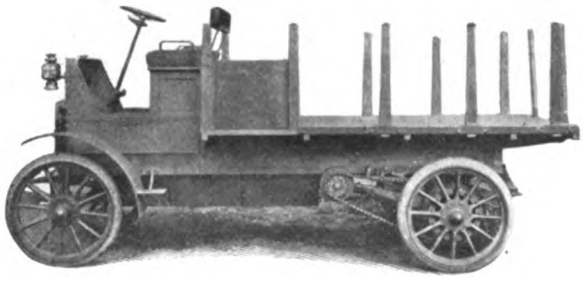
Our newly designed 1500 lb.—2000 lb.—3000 lb. capacity motor trucks are now ready for prompt delivery to merchants, buyers and dealers.



These models are of the most modern design, being equipped with long stroke four cylinder motors especially designed for truck service. The transmission is 50% more than ordinary rating, and its parts are exceedingly heavy and rugged.

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IS THE

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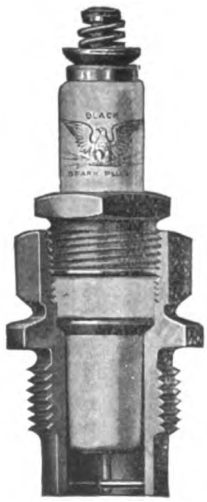
Efficiency and Quality Without Extravagance



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The Plug with a riveted central Electrode, and two contact wires sparking on rounded surfaces, thus avoiding pitting of the wires.

Manufactured and sold by people with whom you will be pleased to do business.

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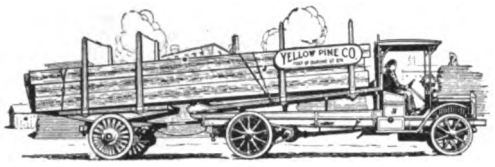

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The supremacy of White trucks is the natural result of superiority.

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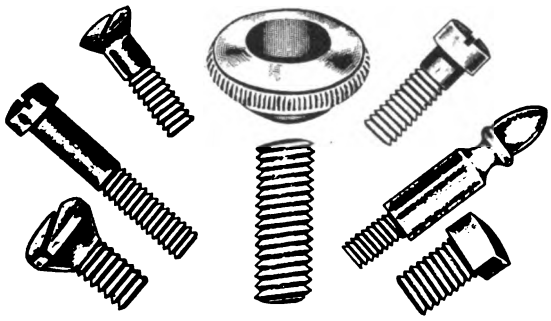

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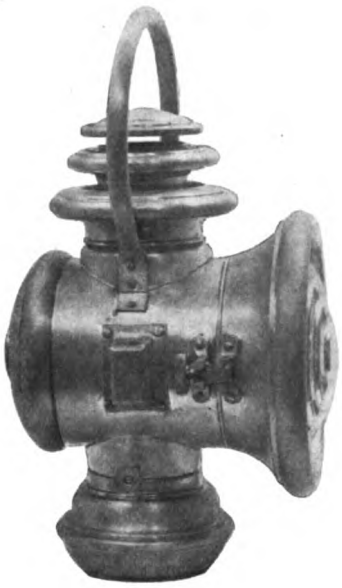

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1 TON *Write us for Agency Details* 1½ TON

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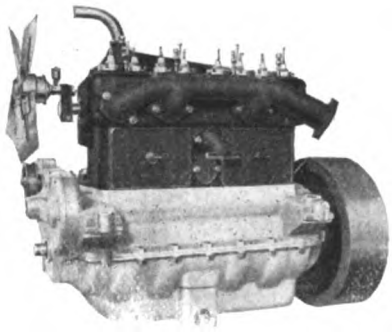
"CONTINENTAL"
COMMERCIAL MOTORS

Designed for Heavy Work.

Manufactured in one-ton to seven-ton capacity.



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When the mercury is up, the **Mercury** runs.

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The Commercial Motor Wagon that never varies.

Manufactured—not assembled.

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Heavy Auto-Truck Wheel Machinery

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Unless your truck is run on DEFIANCE made wheels you do not know the value of the word SATISFACTION.

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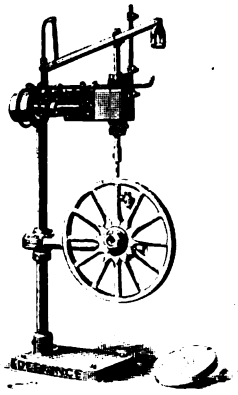
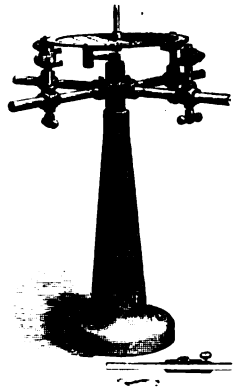


Auto Wheel Driller



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The Defiance Machine Works

435 Perry Street,

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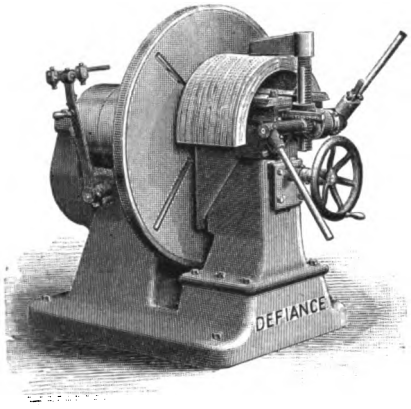
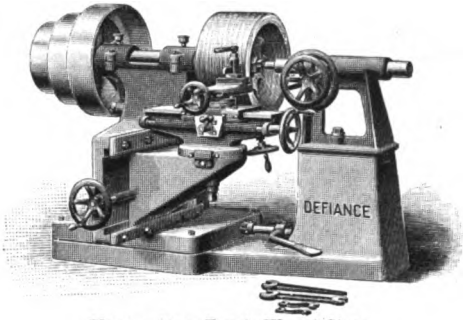


Heavy Auto Truck Rim Jointer



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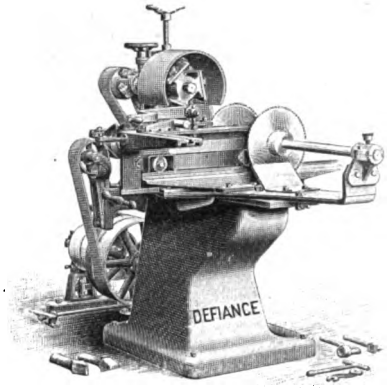
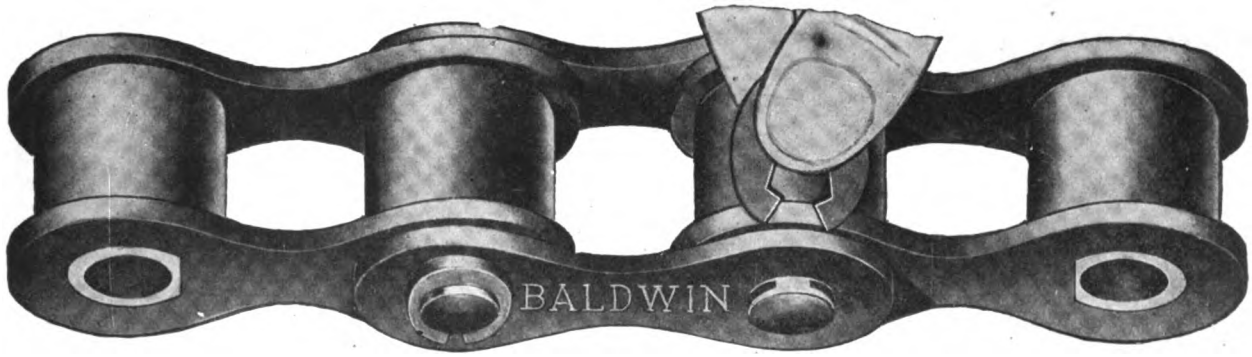


Auto Spoke Mitering and Equalizing Machine

BALDWIN CHAINS



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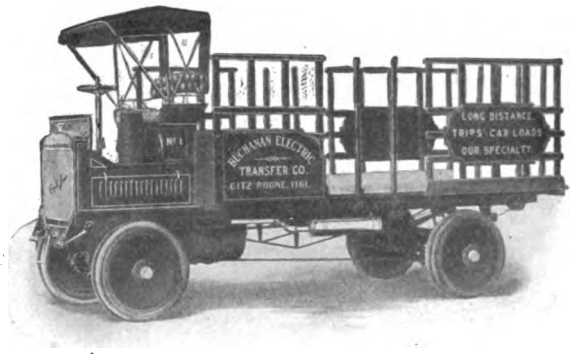

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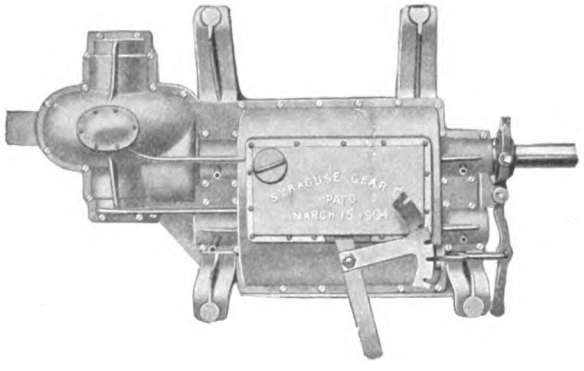

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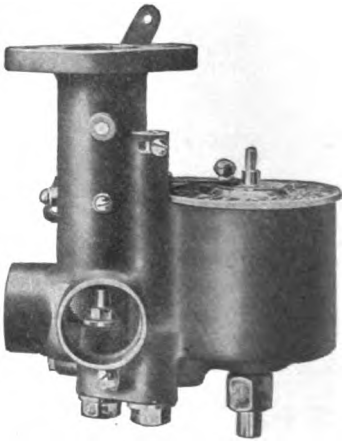

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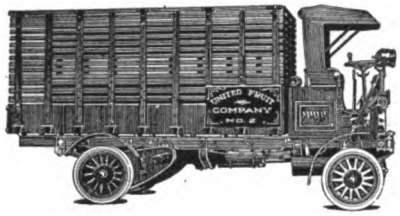

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Gramm efficiency does not demand higher prices, however willing you may be to pay them in order to secure Gramm service.

Stolberg & Parks, furniture dealers of Toledo, have been for three years users of Gramm Trucks. In reply to a recent inquiry they wrote as follows:

"The entire operating expense and up-keep of a two-ton Gramm is less than one-half the up-keep of a two-horse team, and will do double the work on long hauls.

"The Gramm is the popular gas truck in Toledo, and one that we could recommend to be beyond the experimental stage."

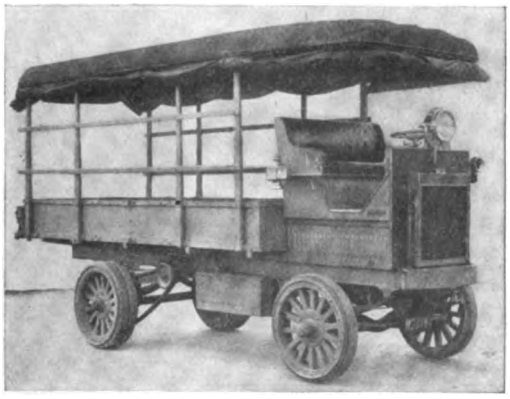
This unsolicited testimonial, which was sent to a third party, gives precisely the facts that the man who is considering the purchase of a truck wishes to know.

The Gramm is built in 1-Ton, 2-Ton, 3-Ton and 5-Ton models. Special bodies planned and built to give the best and most economical service.

The Gramm Motor Truck Co.

111 SO. LIMA STREET, - - LIMA, OHIO

Knickerbocker Trucks



Any mechanical part may be removed on the road in a half hour or less without unloading or dismantling the truck.

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151st Street and River Avenue
NEW YORK

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This stability is due to a minimum of PARTS AND SOLDERED CONNECTIONS—we have one seam for each seven tube element.

It is also due to use of the very best material and workmanship.

The efficiency is owing to free circulation of water, and high impingement of air

We also manufacture cellular and tubular radiators for pleasure cars.

THE HARRISON RADIATOR CO.

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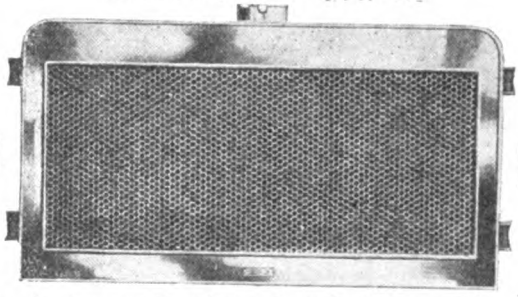
Detroit Office, 1422 Ford Building,



Send us your blueprints and specifications and we will be pleased to estimate on your requirements.

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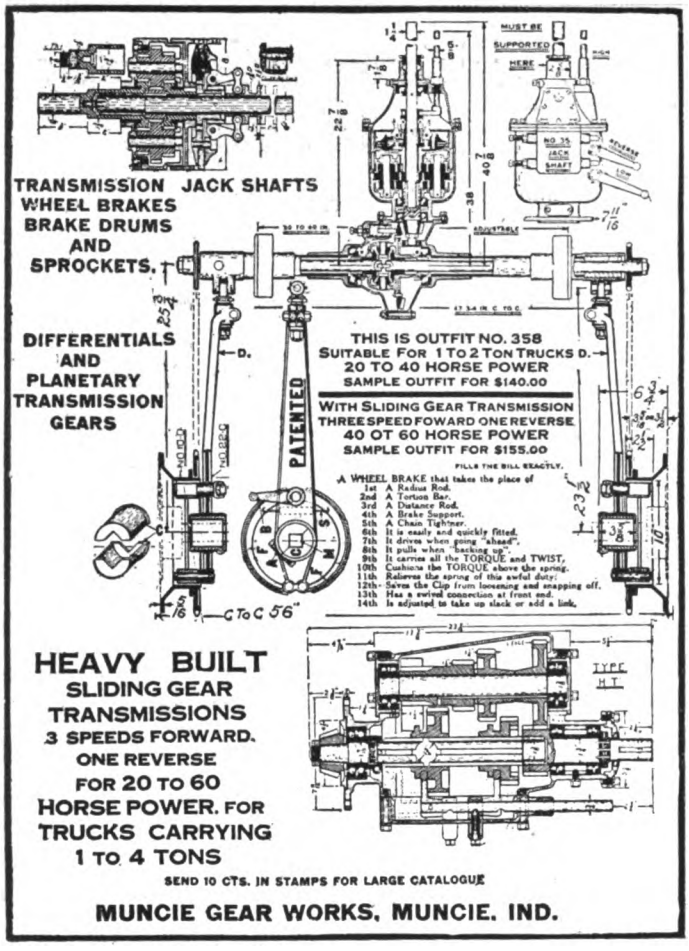

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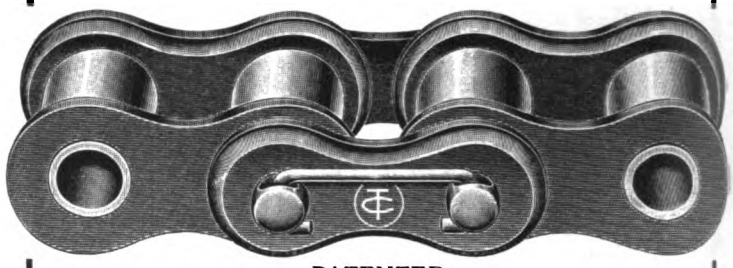
SLIDING GEAR
TRANSMISSIONS
3 SPEEDS FORWARD.
ONE REVERSE
FOR 20 TO 60
HORSE POWER. FOR
TRUCKS CARRYING
1 TO 4 TONS

SEND 10 CTS. IN STAMPS FOR LARGE CATALOGUE

MUNCIE GEAR WORKS, MUNCIE, IND.

Culver-Taylor Detachable Chain



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The Notch Does It

A Detachable Chain with links that will not work loose. TRY THEM. The result will surprise you.

Culver-Taylor Chain Works

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"Always There"

SPLITDORF SERVICE goes arm in arm with SPLITDORF IGNITION—and has been a continuous SPLITDORF POLICY for more than two decades.

From the earliest days of coils and plugs and through every stage of ignition device, SPLITDORF has been synonymous with SERVICE.

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Come to us with your ignition troubles—we will gladly shoulder all responsibilities for changes and adjustments and guarantee the greatest satisfaction.

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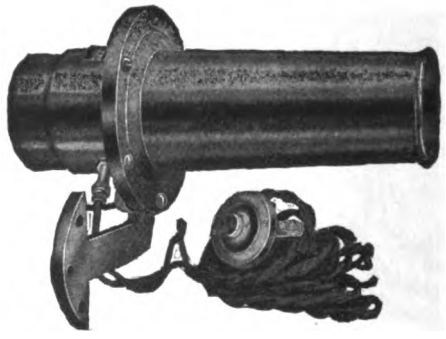
NEWTONE

The Mile Away Electric MOTOR HORN



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PRICE

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Including Button and Cable

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The increased demand for the Newtone Motor Horn is due to its absolute efficiency in warning, and economy in operation.

The motor with Hess-Bright Ball Bearings and imported self-lubricating brushes, eliminate all oiling and cleaning.

The chief engineers of three leading American automobile manufacturers after a "Break-down" test, state that, in their opinion, the Newtone Horn is the best warning signal made.

Let Us Send One On Approval

Automobile Supply Mfg. Co.

220 Taaffe Place, Near Dekalb Avenue, **Brooklyn**

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Steering Gears
for
Trucks—Delivery Wagons

Taxi Cabs Made in 4 sizes—½ to 1 Ton. 1½ to 2 Tons. 2½ to 3 Tons. 4 to 5 Tons.

The Reliable Gear for Hard Service

No ball bearings or thrust collars
Self adjusting for wear, and

Positively Irreversible

Write for Blue Prints

Lavigne Gear Co.
Corliss, Wis.

What is YOUR Delivery Problem?

Consult Our Service Bureau.

Motor Service Bureau,
New York City

Gentlemen:

We are interested in a Motor that will be the kind for our particular delivery. We collect and deliver at the same time, necessitating many stops in same block; we have in the spring heavy but level streets, very muddy in the outskirts, loads never amount to more than 600 lbs without driver. Never have been able to get actual figures from any one who handles same line of business, nor have we been able to find out which is the best, chain or shaft drive, hard tires or pneumatic, whether a good size power plant with speed or small with say 20 miles per hour, a two cycle or four, etc. We run five wagons with 8 horses; in a short time all will have to be renewed and want to get posted before that time.

Thanking you for any information or suggestions, we are

Yours truly

We gladly give information free of charge.

The Review of Reviews Magazine

13 Astor Place, New York City

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THE PROOF OF THE TRUCK IS IN THE TRUCKING

Some of the critical big buyers who have placed "repeat" orders for Packard trucks

Acme Tea Company, Philadelphia
Adams Express Company, New York
American Druggists Syndicate, New York
American Express Company, New York
American Radiator Company, Detroit
Anheuser-Busch Brewing Association, St. Louis
Arbuckles & Company, Pittsburgh
Armour & Company, Chicago
Bell Telephone Company of Canada, Toronto, Ont.
Canadian Transfer Company, Ltd., Montreal and Toronto
Cape Pond Ice Company, Gloucester, Mass.
Crane Company, Chicago
Crystal Park Company, Manitou, Col.
Eastman Kodak Company, Rochester, N. Y.
Field & Company, Marshall, Chicago
Fleischmann Company, The, New York
Goodrich Company, B. F., Akron, Ohio
Hebard Express & Van Company, Chicago
Hudson Motor Car Company, Detroit
Jersey City Dairy Company, Jersey City, N. J.
Kaufmann Brothers, Pittsburgh
Lemp Brewing Company, Wm. J., St. Louis
Libby, McNeill & Libby, Chicago
Loose Wiles Biscuit Company, Boston and Kansas City
Lyon & Healy Chicago
Mandel Brothers, Chicago
Mosler Safe Company, New York
National Cash Register Company, Dayton, O.
Passaic Metal Ware Company, Passaic, N. J.
Parmelee Transfer Company, Chicago
Park Commissioner, Detroit
St. Paul & Tacoma Lumber Company, Tacoma, Wash.
Standard Oil Company, San Francisco
Standard Varnish Works, New York
Swift & Company, Chicago
U. S. Army, Quartermaster's Department, San Francisco
United Cigar Stores Company, Chicago
Victor Talking Machine Company, Camden, New Jersey
Wanamaker, John, Philadelphia and New York
Yawman & Erbe, Rochester, N. Y.

THIS RECOGNITION OF THE PACKARD AS THE STANDARD VEHICLE OF HEAVY TRAFFIC IS DUE TO

Our own ability to deliver the trucks
Our dealers' ability to deliver the service
The trucks' ability to deliver the goods

Packard Motor Car Company, Detroit

Packard

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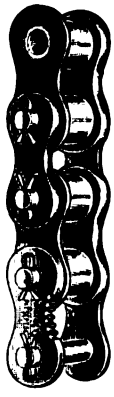
WHITNEY

The Most Practical Chain for Motor Trucks

BECAUSE The "WHITNEY" Cotter Detachable Chain can be easily separated at any link and lengthened, shortened or repaired without the use of any special tool. This is of great advantage to truck builders, owners and drivers.

To have your truck equipped with "WHITNEY" Chains means greater mileage because they are made by specialists, in a factory especially equipped for the making and they are backed by years of experience. Our Chains are made from material chosen for quality, regardless of cost, and all care taken in their manufacture makes them stand foremost.

When making replacements insist on a "WHITNEY" and get acquainted with its merits.



"WHITNEY" Chains Are Built for Strains

THE WHITNEY MFG. CO., - *Hartford, Conn.*

Detroit Oilers Prevent Waste

The Detroit Mechanical Force Feed Oiler gives **sure** lubrication under every condition.

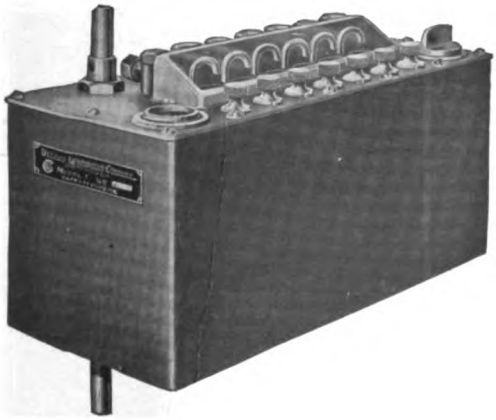
In connection with splash systems the Detroit maintains **exactly** the correct level at all times. At every changing speed the right amount of fresh, clean oil is supplied as fast as the oil is used up.

With the oil level in the crank case maintained at the proper height there is no opportunity for either under-lubrication or over-lubrication.

By preventing over-lubrication the Detroit Mechanical Force Feed Oiler eliminates **waste** of oil and its results—carbonized cylinders, pitted valves, fouled plugs and smoke at the exhaust.

Once properly regulated the Detroit Oiler takes care of itself and needs only an occasional replenishment of the oil supply in the reservoir.

The Detroit Force Feed Oiler gives a **complete** lubricating system for **every** kind of gas engine. It is efficient, economical and sure.



The Detroit Force Feed Oiler has no checks

The Detroit has no ball checks or check valves, springs or other complicated mechanism to get out of order and clog up. It guards against the damage, waste and expense resulting from faulty lubrication. It makes for guaranteed service.

Detroit Force Feed Oilers are made in capacities from two pints to five gallons, with from one to thirty feeds—pulley, rachet, sprocket or gear drive.

They are furnished as standard equipment by many manufacturers of high grade commercial trucks.

The Detroit catalog tells all about the advantages in design and construction which have made the "Detroit" the standard gas engine lubricator.

Write today for catalog P-67 and full information, stating in what kind of truck you are interested.

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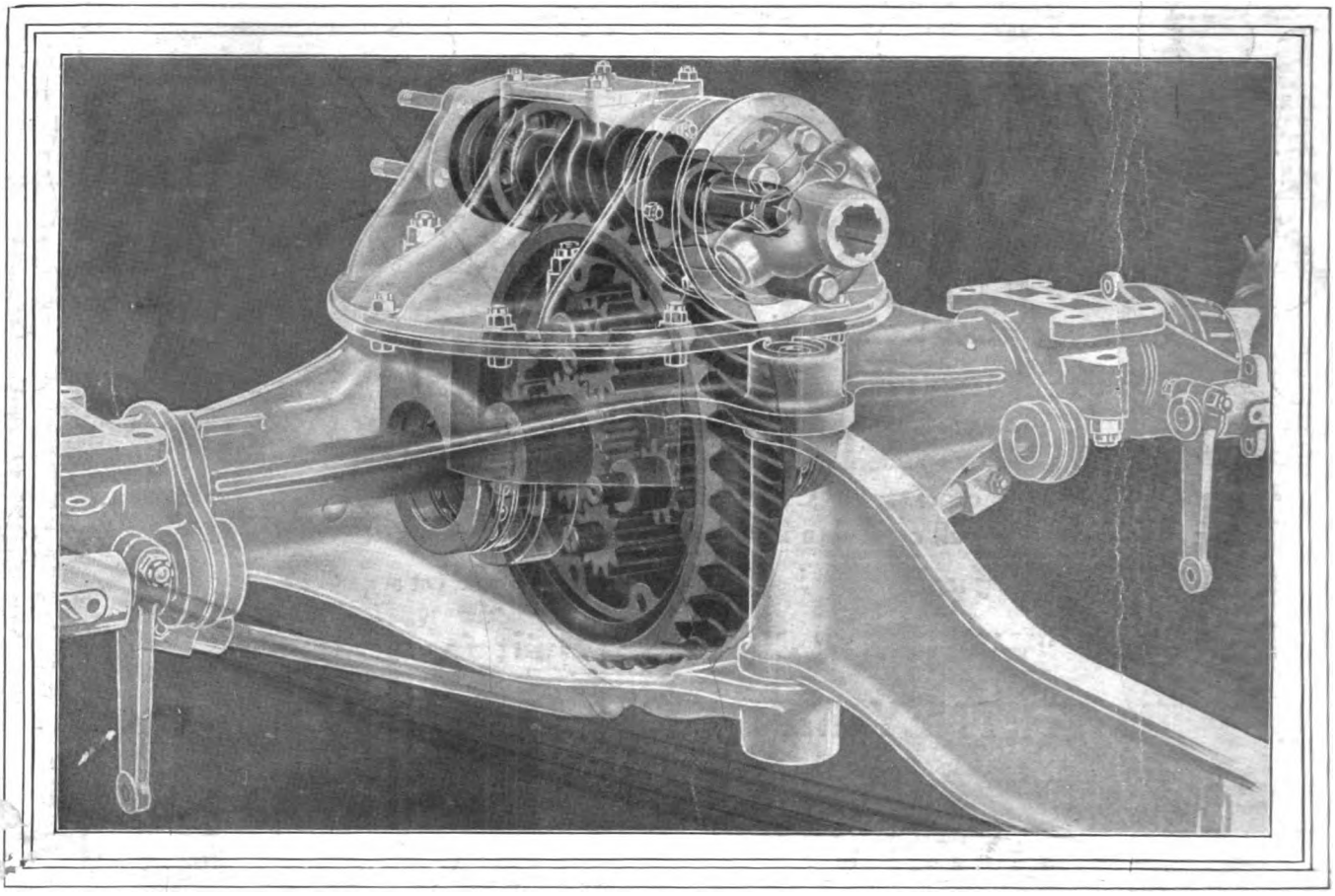

That the worm gear drive is the least wasteful and most durable pathway for power has been proved during ten years of successful use in England—is being proved every day in America by the Pierce-Arrow Truck—and this unqualified guarantee is behind it.

The worm wheel and worm shaft, generally known as worm gear construction, employed in the Pierce-Arrow Truck, are warranted to fulfill their functions for one year from date of shipment, under normal service.

PIERCE-ARROW

5-TON MOTOR TRUCKS

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To renew the charge, book must be brought to the desk.

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